Clinical Lectures
ON
APPENDICITIS: ITS CAUSATION, DIAGNOSIS, AND TREATMENT.

Delivered at the Bristol Royal Infirmary

BY A. RENDLE SHORT, M.D., B.S., B.SC. LOND., F.R.C.S. ENG.,

SURGEON TO THE BRISTOL ROYAL INFIRMARY; LECTURER ON PHYSIOLOGY IN THE UNIVERSITY OF BRISTOL.

PART I.

THE CAUSATION OF APPENDICITIS.

Rise in Frequency in Last Thirty Years.

AT first sight the ætiological problem would appear to be very simple. It is quite certain that the disease was uncommon in this country until somewhere about the year 1895, and that during the period 1895–1905 it rose to its present great frequency. As the writer has shown elsewhere,[1] the records of the Bristol Royal Infirmary prove conclusively not only that appendicitis was not diagnosed at all frequently before 1895, but that very few cases can have occurred. The physicians and surgeons of that period were on the look-out, for the notes often state, "No tenderness in the right iliac fossa." I have read carefully through all the notes, medical and surgical, for the years 1880, 1885, and 1890, and sought to force cases otherwise diagnosed into being cases of appendicitis, but only a few very dubious additional cases can be added to those actually recorded. Mr. Sherren[2] has shown that the rise at the London Hospital took place during the same period (Table I.).

TABLE I.—*Cases of Appendicitis (Acute) at the Bristol Royal Infirmary.*

Year.	Probable or certain cases.	Additional very doubtful cases.	Total in-patients per year.	Year.	Probable or certain cases.	Additional very doubtful cases.	Total in-patients per year.
1880	4	2	2591	1910	58	—	4149
1885	2	1	3370	1915	75	—	3481
1890	4	6	2913	1917	98	—	3907
1895	15	—	2910	1918	113	—	4021
1900	23	—	2865	1923	162	—	6042
1905	64	—	3762				

Private practice shows the same scarcity. The late Dr. Shingleton Smith, who had one of the largest consulting medical practices in Bristol in the eighties and nineties, found very few cases of appendicitis among his records, as compared with other now less common abdominal diseases.

Appendicitis did not become returnable as a cause of death in the Registrar-General's statistics until the year 1901. Table II. gives the death-rate from appendicitis per million living for England and Wales:—

TABLE II.—*Death-rate from Appendicitis per Million Living for England and Wales.*

Year.	Death-rate.	Year.	Death-rate.
1901	38	1911	75
1902	45	1913	68
1903	52	1915	67
1905	57	1918	72
1910	66	1920	67

At first the incidence of the disease was greater in towns and among males, but of late years there has been little difference. The case-mortality from appendicitis used to be much higher than now; in 1903, at St. Mary's Hospital, it was as high as 30 per cent. It will further be observed that the privations of the war period did not alter the incidence of the disease.

It cannot be claimed, of course, that the number of operations for acute appendicitis at the Bristol Royal Infirmary is an entirely accurate register of the prevalence of the disease in the district, but that there was a big rise in the Bristol district between 1895 and 1910 is absolutely certain. In 1885 there were only three cases admitted, and they all recovered, without operation. In 1915 there were admitted 34 cases, *from within the town itself*, with a *perforated* appendix. Surely if there were a similar number of cases in the town in 1885, most of them would have been bound to seek admission to a hospital for nursing through such a severe illness. (The urban population rose from 206,503 in 1881 to 352,859 in 1915.)

Distribution of Appendicitis.

The distribution of the disease in the community brings out some points of importance. It is commonest between the ages of 10 and 30, but most fatal between 5 and 15. It is rare under 3. The oldest patient I have operated on was aged 84, and in spite of the fact that the appendix had perforated he did very well. There are families which appear to be particularly prone to the disease. During the war it seems to have been about equally common amongst soldiers and the general population. The most interesting feature, however, is the relative immunity of the inmates of such institutions as workhouses, homes for poor children, and prisons. For ten years there was only one case at Portland Prison. The writer is the surgeon usually called in for operations on the inmates of two local institutions; the one is a big public school where the boys are well fed on a modern diet, and the other is an orphan home. Although the children at the orphanage are more numerous, and are in residence all the year round, there were in a five-year period 19 cases of appendicitis at the school and only four at the orphan asylum. The difference seems to lie in the diet. At the orphanage the daily routine includes porridge and bread with margarine, dripping, or treacle, tinned meat with potatoes and greens on certain days, and fresh meat once a week, with broth or rice on the other days.

Turning to the national distribution, we find briefly that appendicitis is common in the more civilised European and American countries, rather uncommon in the more poverty-stricken countries of Southern Europe, and very rare in Asiatics, Africans, and Polynesians. If, however, individuals from these races are taken into the service or society of Europeans and eat their food, they acquire the European's liability to the disease. Indian students in this country are by no means immune. In the United States it is even commoner than here, but is seldom seen in the "black belt" of Alabama or in negro schools or institutions. A missionary from Barbados tells me that he has never heard of a case in a West Indian negro, but whites are frequently affected; the population is about 12 blacks to 1 white.

Now the characteristic difference between those peoples who do and who do not get appendicitis is that the food of the latter is much simpler, contains a larger relative bulk of coarse vegetables, and often a smaller amount of meat. In some countries where appendicitis is very rare the amount of meat eaten is considerable; for instance, in Abyssinia and in Madagascar. We have no accurate statistics of the incidence of the disease amongst populations that live very largely on meat, such as the Eskimos and Paraguayans, but as far as we know there is no great amount of appendicular trouble. A curious and interesting fact is that apes in captivity acquire the human liability to appendicitis (present in 10 out of 61 autopsies in chimpanzees).

When we come to piece together what we know about the distribution of the ailment, we shall readily conclude that it must be due to some food factor, but we shall need to tread warily in seeking to go further. So many baseless theories have been advanced that the late Dr. Charles Mercier, with characteristic playful

[1] Rendle Short: Brit. Jour. Surgery, October, 1920, viii., 171 (with bibliography).
[2] Sherren: Practitioner, June, 1905.

irony, maintained that the trouble is due to the abandonment of wig-wearing; there were no recorded cases from the days of Charles II., when wigs came in, till the end of the eighteenth century, when they went out, except on the heads of judges, barristers, and Victorian bishops. He knew of no cases in legal luminaries—"and who ever heard of appendicitis in a wigged bishop?"

Change in Dietetic Habits in Past Thirty Years.

Now, our significant period, 1895 to 1905, has been very important in the dietetic history of our country, because it has witnessed the passing of the older food habits of our people, and the inauguration of the modern dependence on imported articles. Up till 1895 England in the main fed herself; since that time she has paid other countries to feed her. This may be demonstrated by a study of the Blue-books relating to food imports. The principal cargoes are wheat and other grains, meat, butter, tea, coffee, cocoa, sugar, rice, bananas, oranges, currants, and raisins. Most of these may be dismissed the court with the briefest of inquiries.

There is, however, much to be said for the widely held view that meat-eating has led to an increase of the disease. Table III. shows the average annual consumption of *imported* beef and mutton from 1880 to 1917. Compare this with Table I., showing the number of cases of acute appendicitis at the Bristol Royal Infirmary. The correspondence is striking. O. T. Williams demonstrated that the inflamed appendicular mucosa may contain an excess of calcium soaps and other insoluble compounds of the saturated fatty acids, which he believes to have been derived from meat-fats.

TABLE III.—*Showing the Annual Consumption of Imported Meat per Head of Population, for United Kingdom, in Pounds.*

Year.	Bacon and ham.	Beef: salted, frozen, fresh.	Mutton: fresh, frozen, &c.	Beef from live cattle imported.	Mutton from live sheep imported.
1880	15·9	2·5*	—	5·8*	—
1890	13·5	6·0	4·9	11·1	0·6*
1895	14·6	6·7	7·5	8·1	1·3*
1900	19·5	11·7	9·2	9·2	0·6*
1905	17·4	13·1	9·9	9·5	0·26
1910	11·2	17·4	13·5	3·2	0
1914	14·2	18·0	12·4	0	0
1917	18·0	18·0*	6·0*	0	0

* Rough figures calculated from published returns.

As Table III. shows, the importation of beef doubled in the critical period 1895 to 1905. Imported mutton rose from a mere trifle in 1880 to 13·5 lb. per head in 1910. If this rise was the effective cause of the great increase in appendicitis which was coeval with it, the fault might lie in the preservation of the meat, or in the excessive quantity eaten.

Question of Preserved Meat.—Although the reasons for doubting the drawbacks of the preservation may not be quite conclusive, there are points which go to exonerate it. During the war the diet of the soldier and sailor, especially overseas, contained a much larger proportion of preserved meats than they were accustomed to in private life, as those of us who were in France can very well remember. Yet the incidence of appendicitis amongst the serving forces was certainly not excessive; perhaps less than in the civilian community. In institutions the meat is usually of the preserved variety, but appendix troubles are uncommon. In 1921 about 47 per cent. of the meat eaten was imported; if those numerous members of the community who always insist on having English meat were free from appendicitis, it would be a disease of the poor rather than of the well-to-do and the farming class. There is no evidence of any such class-immunity. Europeans in the tropics get very little frozen meat, yet they suffer.

Question of Increase in Total Meat-eating.—No doubt in the "hungry forties," and for many years after, meat was very seldom seen on the tables of the poor, at any rate in towns. But it must be remembered that although many persons got very little meat prior to the advent of the meat-ship fleets, there has always been a considerable minority who got plenty. The farming fraternity, soldiers, and well-to-do families ate as much as they do to-day. Our old songs sing the praises of the "Roast Beef of Old England." There was a farmer's proverb in those days that a goose is a fool of a bird, too much for one and not enough for two. Returns to Parliament made in 1889 as to soldiers' meat rations and the meat eaten by carmen show that if meat-eating is the cause of appendicitis there ought to have been plenty of cases in 1889.

Then again, although there was such a rise in the import of meat, there was by no means such a conspicuous rise in its consumption, for the importation of live cattle and sheep for slaughter ceased, and the consumption per head of home-grown beef and mutton was falling (Table IV.).

TABLE IV.—*Showing Consumption per Head of All Imported Meats, Dead or Alive, in Pounds per Annum, also Resident Cattle and Sheep.*

Year.	Population of United Kingdom.	Resident cattle.	Resident sheep.	Consumption of all imported meats.
1885 ..	36,300,000	6,600,000	26,000,000	24·1
1890 ..	—	6,500,000	27,000,000	36·1
1895 ..	39,200,000	6,300,000	26,000,000	38·2
1900 ..	—	6,800,000	26,000,000	50·2
1905 ..	42,900,000	7,000,000	25,000,000	50·1
1910 ..	—	7,000,000	27,000,000	45·3
1914 ..	46,000,000	7,100,000	24,000,000	44·4
1917 ..	—	—	—	42·0

If we compare the rise in the incidence of appendicitis at the Bristol Royal Infirmary with the figures for the consumption per head of all forms of imported meat, dead or alive, there does not seem enough difference in the meat figures between 1895 and 1905 (and later years) to justify the theory that appendicitis is due to the increase in meat-eating. The actual figures are 38 lb. per head in 1895 and 44 lb. in 1914, and against this has to be set the rather smaller consumption of home-grown meat. And there are other difficulties in the theory. Severe meat-rationing during the war did not reduce appendicitis.

The Question of Food Preservatives.—We cannot well blame the use of boric acid, formalin, and other chemical food preservatives. They came into use too early (1880 to 1895). Since 1900 the use of antiseptics has declined, but the amount of appendicitis has greatly increased. In Denmark, where all antiseptics are prohibited in foods, the disease is common.

The Ultimate Cause of Appendicitis.

What, then, is the ultimate cause of appendicitis? Our apparently simple problem has become unexpectedly complicated, just when our wealth of data seemed about to yield up its secret. It is, of course, possible that a vitamin-defect may be responsible. But we ought not to blame the unknown before exhausting the possibilities of the known. One thing is quite certain and can be mathematically demonstrated, and that is that the older, coarser, cellulose-containing vegetables have suffered a relative elimination in our modern dietaries. When we consider that the citizen of to-day regales himself with 18 lb. of imported beef, 6 or 10 lb. of imported mutton, and an enormous quantity of imported wheat-flour, to say nothing of fruits, &c., none of which articles of diet from overseas were available for his fathers, it is clear that there has been a real increase of these food-substances in the diet of the people, and therefore a reduced proportion of the old-fashioned vegetables. We do not lose sight of the fact that when the population was smaller the British farmer could do more for his fellow-countryman in supplying him with meat and corn, but the disparity is too great to be explained entirely thus.

Summary.

Let us see how far this possible explanation will fit our facts. (1) The national distribution of appendicitis is in favour of the hypothesis. In practically all the lands where it is rare or unknown, the diet contains a large proportion of vegetables and cellulose-containing articles. If the natives desert their own food habits and take to European diet they get appendix troubles. (2) The time factor in this country is right. It was during the period 1895–1905 that England ceased to feed herself, and the modern rise of the disease coincides remarkably. (3) Institutions where the older and cheaper dietary prevails enjoy a relative immunity. (4) At first appendicitis was a disease of males and of the town. At first the breadwinner was given the best food; in the country, the home-grown produce maintained its place on the table for a while. Now there is little difference between the diet of town and country. (5) Apes in captivity are liable to appendicitis, and their cage diet no doubt contains more food of the break-and-milk variety and less coarse vegetables and roots than in the wild state.

There is some experimental evidence that deprivation of cellulose may lead to inflammation of the cæcum. Von Knierien showed in 1885 that rabbits fed on a cellulose-free diet developed inflammation of the cæcal region. In carnivores this did not occur. The effect seems to be partly mechanical, for horn-shavings will avert the trouble. It is well known, of course, that cellulose is not acted on by the ordinary digestive ferments.

Table V., from Bunge, gives the cellulose content of some foodstuffs.

TABLE V.—*Percentage Cellulose Content of Some Foodstuffs.*

Wheat flour	0·4	Spinach	8·1	Asparagus	17
Rice	0·7	Green peas	8·7	Cabbage	18
Wheat	2·9	Carrots	8·8	Strawberries	19
Potato	3·1	Apples	10	Melon	22
Lentils	4·1	Radish	12	Pears	25
Beans	4·1	Cauliflower	13	Raspberries	47
Onion	5·0	Cucumber	14		

THE DIAGNOSIS OF ACUTE APPENDICITIS.

A consecutive series of personal cases, including 400 operations for acute appendicitis and many others for interval cases and for appendicular gastralgia, all falling within a ten-year period, have been analysed for the purpose of these papers. (The records of a number of cases operated on whilst overseas on war service are not available.)

In the majority of cases there is no difficulty in making a diagnosis, but as every man of experience knows, it may be very hard to arrive at a correct opinion. One may be deceived, first, into thinking the case is not one of appendicitis when it is, or second, a diagnosis of appendicitis may be incorrectly made. Only such difficulties as the writer has actually encountered will be discussed.

It may be taken as a general rule that so long as the pulse and temperature, evening and morning, are normal, and the pain and tenderness in the abdomen not very marked, it does not matter seriously even if a genuine appendicitis is undiagnosed and let alone for a few days. The cases which one has seen in which the appendix has been allowed to perforate and become really dangerous, have all been due either to an abnormal position of the appendix or to the coincidence of diarrhœa.

Sources of Diagnostic Error.

Abnormal Position.—The most dangerous "miss," in my experience, is when the patient has an appendix lying deep in the pelvis. The error can only be avoided, first, by bearing it constantly in mind, and second, by making a rectal or vaginal examination in all doubtful cases. Zachary Cope's sign—pain and resistance on internal rotation of the thigh due to stretching of the obturator internus—may help in late but not often in early cases. Another error due to position, which I once made in consultation with a distinguished physician, arose from the inflammation occurring at the tip of a long retrocæcal appendix. In this case we thought the duodenum was at fault, on account of the tenderness being so high up. The gall-bladder, too, may be wrongly suspected. Sometimes the signs may be far out in the loin.

Appendicitis accompanied by diarrhœa is very likely to give rise to difficulty in recognition. To know that it may occur is a considerable safeguard. One gets fever, pain, and tenderness, of course, with a simple diarrhœa, but the tenderness will not be *constant* in the appendix region. It is surprising sometimes how badly inflamed an appendix, even if normally situated, may become, and yet the physical signs in the way of tenderness and resistance be very slightly marked. It is wise to use as a working rule, that pain with vomiting and with fever, and even *slight* tenderness and resistance in the right iliac fossa, if these are constant, demand an exploration, unless some definite diagnosis besides appendicitis can be made.

Turning to the other class of error, every surgeon must confess that he has removed a certain number of appendices which did not deserve the suspicion cast upon them. The simple though unsatisfactory fact is that we badly need a reliable sign of early appendicitis. The various signs suggested are not very helpful in the really difficult type of case, and the same applies, in my experience, to Zachary Cope's signs, the obturator test already referred to, and the psoas test—pain on over-extending the thigh.

The most frequent error, in my experience, has been the removal of the appendix when no abnormality whatever could be found in the abdomen and no evidence of disease ever came to light elsewhere. These cases may be very puzzling, and it may be impossible to discover on analysis afterwards any difference either in quality or degree between the signs and symptoms in one of them and in a case of badly inflamed appendix. I have been impressed by the fact that these pseudo-appendicitis cases are very uncommon in children under the age of 15. They are most often seen in women over 30. In cases of the colic and wind troubles so often met with in the course of an attack of influenza the careless diagnostician will fall into the trap. But under these circumstances *pain is not the first symptom*, as it almost invariably is in genuine appendicitis, and although there may be quite marked pain and tenderness in the right iliac fossa, they keep shifting about, one may feel wind rolling round, and an enema gives prompt and effectual relief.

Persons suffering from the condition shortly to be described under the title of "mobile cæcum," which is so confusing in the diagnosis of chronic appendicitis, may have a rise of temperature occasionally, from some totally disconnected cause, and this may lead to error.

Sometimes the operator has qualms as to his diagnosis when a careful examination of the interior of the appendix will show the true cause to have been the presence of oxyurides. On 15 occasions I have made a diagnosis of acute febrile appendicitis, and removed an organ apparently normal, but inspection showed that it contained threadworms. One will usually find the nearest lymphatic nodes swollen in these cases, and it seems beyond question that the pain, fever, and vomiting are due to the presence of the worms.

The next most frequent error in the series has been the failure to distinguish between appendicitis and *tuberculous mesenteric glands in children*. On three or four occasions within my memory the abdomen has been opened on a confident or tentative diagnosis of acute appendicitis, and nothing found but tuberculous glands, few or many, either in the mesentery, or retroperitoneal in the angle between the termination of the ileum and the cæcum. In one case the appendix was also slightly inflamed, probably not enough to give rise to a temperature, and the lymphatic glands in the area draining the appendix showed some swelling and redness superadded to an old-standing enlargement due to tuberculosis, in which many other mesenteric glands shared. This suggests that the cause of the fever and pain in other children with tuberculous mesenteric glands whose appendices are

normal, may be some absorption of toxins or bacteria from the bowel, which the damaged lymphatic nodes are unable to arrest without suffering. It is difficult at present to give directions for avoiding this mistake. The pain and tenderness and resistance may be much less definitely located to the right iliac fossa than is usual in true appendicitis, but, on the one hand, the symptoms of the latter condition are not always typical, and, on the other, the inflammation of the tuberculous glands may be confined to the neighbourhood of McBurney's point. There may even be a tender palpable lump, which is nearly certain to be taken for an abscess, but in this case the tuberculous lymph-gland may be single, and it may be in the patient's interests to remove it, whereas if the lymph-nodes are widely involved nothing can be done, and the operation was therapeutically useless.

Other sources of error have been very infrequent, and are represented in my series by only one or two of each. The catalogue includes *B. coli* pyelocystitis, puerperal sepsis, pneumonia, gonorrhœal peritonitis, carcinoma of the cæcum, solitary ulcer of the cæcum, and tuberculous peritonitis. On a few occasions there has been confusion between appendicitis and perforated duodenal ulcer, pneumococcic peritonitis, pyosalpinx, or cholecystitis, but here, as well as in the case of several of the conditions already mentioned, no harm is done, because operation is the proper treatment.

Confusion with Pneumonia.

It is a very serious mistake to operate on a patient with pneumonia and one which demands constant vigilance if it is to be avoided. I remember one such being sent 20 miles in an open car in January; needless to say, this proved not to be good treatment for the pneumonia, and she died. It is usually stated that if it is pneumonia there will be an alteration of the pulse-respiration rate, and if this sign is present it is, of course, very valuable evidence, but it is far from constant. Table VI. gives the diagnostic features, but the final opinion must be based on the whole clinical picture and not on any one so-called infallible sign.

TABLE VI.—*Early Pneumonia and Appendicitis: Diagnostic Table.*

Early pneumonia.	*Appendicitis.*
Pain may not be the first sign.	Pain always the first sign.
Pain severe, constant, widespread.	Pain not so severe, paroxysmal at first, more localised.
Vomiting rather uncommon.	Vomiting usual.
Diarrhœa common.	Diarrhœa uncommon.
Facies anxious; alæ nasi may be working; herpes common.	Nothing special.
Pulse-respiration rate quickened.	Normal relationship (1 to 3½).
Temperature 102°–104° F.	Temperature 98°–101° F.
Pulse under 100.	Pulse over 100, if temperature is raised.
Tenderness diffuse over right side.	Tenderness over appendix region.
Respirations mostly abdominal, "catchy."	Respirations mostly costal.
Sticky crepitations may be heard.	No.
Rectal examination nil.	Rectal examination perhaps tenderness.

It ought to be remembered that in those cases where violent symptoms come on within 24 hours and the patient is in great pain and distress, with high fever and diarrhœa, it will probably prove to be pneumonia with pneumococcic peritonitis, and the prognosis is grave. If in real doubt, it is better to wait 24 hours in a case of appendicitis than to operate for incipient pneumonia. At the end of that time the diagnosis has nearly always clarified itself.

Patients who are pregnant, or have recently been delivered, are veritable traps for the unwary, and it is wise to approach them with a bias against operation, unless the signs are crystal clear. During pregnancy an attack of right-sided abdominal pain, with vomiting, fever, and tenderness about the appendix, is much more likely to be *B. coli* pyelocystitis, which ought not to be operated on. Occasionally the same mimicry is seen in unmarried women, or just after marriage. A rigor, the very high temperature, and in some cases (not all) some frequency of micturition will put us on our guard. A bacteriological examination of the urine clinches the diagnosis.

Shortly after a confinement, a very accurate imitation of appendicitis can be given by puerperal (uterine) sepsis, as well as by parametritis. The second mistake does not matter seriously; the former does, as the laparotomy will be useless and the patient may very likely die. In young women with what appears to be appendicitis, especially if the tenderness is rather diffuse over both sides of the lower abdomen, we should consider the possibility of gonorrhœal peritonitis, and it is a moot point whether one ought to operate if the evidence points to that diagnosis. A useful clue may be given by inspection of the vagina and cervix, and by a rectal examination.

As my old teacher Prof. C. A. Morton has recently pointed out, it may be difficult to distinguish between carcinoma of the cæcum and appendicitis, and I have seen a case or two in which the error has been made in each direction when a tender mass was palpable in the right iliac fossa. It is not well known that there is a solitary ulcer of the cæcum or ascending colon, of which I have seen two examples within the past year, in which there is a painful lump which was diagnosed as appendicitis, once by myself and on the other occasion by another surgeon. It is cured by excision.

Appendicitis and the Specific Fevers.—There may be an authentic appendicitis coming on coincidently with measles or with typhoid fever. I have had two examples of the first and one of the second under my care, and in each case the appendix was acutely inflamed, swollen, and buried in exudate. The combination of measles with this disease is a very serious one. My first case was operated on one Christmas day at a country farm-house. The other children had measles. Perforation of the appendix had taken place; next day the measles rash came out and the boy died of pneumonia and peritonitis. In the second case there was no reason to suspect measles; immediately after the operation the lad had great difficulty in breathing and became dusky, and the next day the right lung was solid with pneumonia. It was supposed that he must have aspirated some vomit, but on the third day a measles rash appeared and the lung suddenly cleared up and the alarming symptoms passed away. No doubt the ether had converted a latent bronchitis, which had given no evidence of its presence, into a severe pneumonia, albeit of brief duration.

THE DIAGNOSIS OF CHRONIC APPENDICITIS.

It is now widely recognised that the diagnosis of chronic appendicitis has been far too frequently made, and that removal of the organ *when the patient has not been seen in an acute attack* has often failed to relieve the symptoms. Some American writers go so far as to say that there is no such thing as chronic appendicitis, but this is an over-statement. Given wise selection, the number of useless operations need be very small.

The main factor in arriving at a correct diagnosis of chronic appendicitis is to get a reliable history of a definite acute attack. When this is lacking one must proceed cautiously. The most prominent symptoms will be, of course, pain and tenderness in the right iliac fossa. One must first exclude those numerous conditions which may give rise to pain in the right iliac fossa, which give definite evidence of their presence when carefully looked for. Here belong mucous colitis, renal aching, gynæcological troubles, growths of the cæcum, solitary ulcer of the cæcum, psoas abscess, tuberculous spine, nerve-root pressure, &c. But when these have been excluded, there is a large residuum, especially in women, which must not all be labelled and treated as chronic appendicitis if one wishes to avoid much useless operating. This residuum includes a majority group, suffering from the ailment variously described as "mobile cæcum," visceroptosis,

or Lane's chronic intestinal stasis, and a minority group who have an authentic chronic appendicitis. The cause of the pain and tenderness in the first or majority group is dragging and distension of a large, loose, dropped cæcum. On exploration one may also find Lane's ileal kink, an appendix looped up in retention bands (which ought not to be called adhesions), extensive Jackson's pericolic membrane, and general visceroptosis. The pain in such cases is due to a combination of ptosis of the cæcum and adhesions or bands about it, giving rise to kinking or to a concertina arrangement of the cæcum and ascending colon. Obviously it is useless to remove the appendix if the pain is due to such a cause, and here is the main reason for the unsatisfactory surgery we have just referred to.

A careful history will generally help us to distinguish between this condition and true chronic appendicitis. The pain of mobile cæcum is continuous day after day for weeks, months, or years; now better, now worse, but seldom entirely absent. It is often (not always) relieved by recumbency, and especially by taking meals lying down. (This avoids the kinking or concertina-deformation of the cæcum, which occurs when that organ prolapses into the pelvis but is held up here and there by bands. Taking food leads to cæcal peristalsis, which is painful under such circumstances.) The costal angle is narrow and often the kidney is movable. This type of patient is suffering from the virginal form of visceroptosis, not the maternal, so one must not expect to see marked sagging of the lower anterior abdominal wall. Very valuable evidence will be given by a barium meal, showing general visceroptosis, a distended cæcum, perhaps prolapsed and tied by bands, and marked delay in its emptying time.

In genuine chronic appendicitis, on the other hand, the usual history is of periods of pain and periods of freedom from pain. The patient may be able to count the attacks, although there may never have been any rise of temperature. The above-mentioned signs of visceroptosis are absent, and recumbency does not give relief. Sometimes, it is true, one sees a patient with never-ceasing pain due to the appendix, completely and permanently cured by removal thereof, but it requires considerable circumspection to pick these out from amongst the merely cæcal cases.

Patients suffering from pain of cæcal origin ought not to be operated on until good trial has been made of a Curtis belt, liquid paraffin, recumbency for meals, a diet rich in vitamins, &c. If one is driven to operate, or finds the condition during an exploration for appendicitis, my practice, in addition to removing the appendix, is to perform a cæcoplication, not so much to narrow the cæcum as to shorten it, and the results have been very good. Others perform Waugh's operation. In a very few very extreme cases I do a hemicolectomy and have had a few failures and a number of striking and lasting successes. Some surgeons excuse the recurrence of pains after removal of the "chronic" appendix by alleging that adhesions have formed. This must be very rare. In my experience, if the diagnosis of chronic appendicitis is only made in accordance with the principles just described, there will be few if any patients coming back again for recurrent pains after removal of the organ.

LATENT APPENDICITIS.

Chronic inflammation of the appendix may be responsible for symptoms quite different from those already described. These cases of latent appendicitis fall into three groups at least: (1) Irregular attacks of fever, perhaps vomiting, and vague abdominal pains in children and boys and girls of school age, but with no signs localised in the right iliac fossa; (2) symptoms like those of gastric or duodenal ulcer, but usually atypical in some respect (= appendicular gastralgia); (3) profuse hæmatemesis with or without dyspeptic symptoms, associated with a small atrophic impervious appendix.

(To be concluded.)

THE BASAL METABOLIC RATE:
ITS DETERMINATION AND INTERPRETATION.

BY HENRY F. MOORE, M.D., D.Sc.,

VISITING PHYSICIAN, MATER MISERICORDIÆ HOSPITAL, DUBLIN; FORMERLY ASSISTANT, HOSPITAL OF THE ROCKEFELLER INSTITUTE FOR MEDICAL RESEARCH, NEW YORK.

(From the Wards and Metabolism Laboratory of the Mater Misericordiæ Hospital.)

IN his book, "The Science of Nutrition," Lusk[1] says: "In each mammal there is a basal metabolism." By the term "basal metabolism" or "basal metabolic rate" is meant the minimal heat production of an organism, measured from 12 to 18 hours after the ingestion of food (post-absorption state) and with the organism at complete muscular rest in a comfortably warm environment. This minimal heat production may be determined *directly* by actual measurement by means of a calorimeter, or *indirectly* by calculating the heat production from determination of the amount of oxygen used within the organism and the corresponding amount of carbon dioxide produced, together with the total nitrogen eliminated.

Francis G. Benedict[2] states that the level of vital activity may be inferred from the amount of heat produced; whilst heat is the end-result of glandular and muscular activity, oxidative processes are essential factors in these transformations. Thus, the intake of oxygen is essential to combustion, while the production of CO_2 makes up a very large part of the total oxidative processes of the body. Therefore, if one can measure accurately the carbon dioxide produced, or, better still, the oxygen consumed, a very close estimate of the total heat production, and consequently of the end-results of glandular and muscular activity, may be secured. Thus, by determining the oxygen consumption under suitable conditions in a given time the basal metabolic rate may be calculated.

THE BASAL METABOLIC RATE IN RELATION TO THYROID DISEASE.

The essential function of the thyroid gland is the elaboration and delivery to the organism of thyroxin, a substance which was isolated in crystalline form in 1915[3] by Kendall. According to Plummer,[4] the following statements hold true: (*a*) Thyroxin is active directly or indirectly in the cells throughout the body and, acting as a catalyst, it hastens the rate of formation of a quantum of potential energy available for transformation on excitation of the cell; (*b*) hyperthyroidism is the physiological or pathological status of an individual, otherwise normal, when the thyroxin in the tissues is sufficiently increased to hold the basal metabolism above normal; (*c*) all the phenomena in pure hyperthyroidism are those that attend a sustained elevation of the basal metabolism above normal; (*d*) the status of the hyperfunctioning adenomatous goitre is the result of pure hyperthyroidism, while that of exophthalmic goitre is not accounted for by a pure hyperthyroidism (possibly here the thyroxin formed is chemically different in a slight way from normal thyroxin); (*e*) adequate intravenous administration of thyroxin to thyroidless patients, who invariably have a low basal metabolic rate, always restores the basal metabolic rate to normal; (*f*) the average daily exhaustion of thyroxin by the tissues is from 0·75 to 1 mg.

Boothby[5] states that by the term hyperthyroidism is meant the clinical syndrome resulting from the action in the body of an excess of thyroxin. From 12–14 mg. of active thyroxin must be present in the body to maintain the basal metabolic rate at the normal level; excess of thyroxin in the organism increases the rate.

A decrease of the basal metabolic rate is characteristic of myxœdema or cretinism, and is due to the inability of the thyroid gland to furnish sufficient thyroxin to the body.

Thus, it is seen that the determination of the basal metabolic rate may be of significance in the study of disease of the thyroid gland. The possible increased basal metabolic rate in active acromegaly and the decreased rate in hypopituitarism suggest that the alteration in the activity of the pituitary gland may change the metabolic rate, but there is little evidence that the secretion of any part of the pituitary gland is concerned with the normal rate of cellular combustion in the sense that its secretion acts, like thyroxin, as a calorigenic agent. There are certain other diseases in which an increased basal metabolic rate is occasionally observed—e.g., severe anæmias and leukæmias; the cause of the increased metabolism in these instances is not known. Du Bois[6] has shown that increase of the basal metabolic rate in fevers follows Van't Hoff's law of the velocity of chemical reactions with temperature change—i.e., the basal metabolic rate is about doubled for an increase of temperature of 10° C. It is interesting to note, in passing, that in 1919 Kendall[7] stated that 33 g. of thyroxin had been separated from 6550 lb. of fresh thyroid material. Thyroxin is stated to be 4-5-6-tri-iodo-2-oxybeta-indole-propionic acid; it is closely related to tryptophane; it is a white crystallisable substance and heat-stable.[8]

METHODS OF ESTIMATING THE BASAL METABOLIC RATE.

The methods available for the estimation of the basal metabolic rate fall under two main categories:—

1. *Direct Calorimetry.*—The heat produced in the metabolic processes is determined in a respiration calorimeter chamber. The apparatus needed is extremely expensive and complicated, and necessitates a number of highly-trained technicians. This method is altogether outside the resources of hospitals, and it is used only in a few institutions especially equipped for research on metabolism.

2. *Indirect Calorimetry.*—Here either the oxygen absorbed or the carbon dioxide liberated in a given time, or both, are measured. From these figures the respiratory quotient can be calculated, and if the nitrogen eliminated in the urine is estimated at the same time it is possible to apportion the oxygen used for the burning of protein, carbohydrate, and fat. The determination of the respiratory quotient and nitrogen elimination are, generally speaking, not necessary in clinical work. "The validity of the method has been established beyond a doubt by the simultaneous measurement of heat by physical means, and of the gas exchange in a respiration calorimeter."[9]

There are two chief methods of indirect calorimetry:—

1. *The Open Circuit Method.*—The external air is breathed and the expired air trapped in a spirometer bell or bag, from which samples can be removed for analysis, and their oxygen and carbon dioxide content determined. The disadvantages of the use of this method in clinical medicine are that it is time-consuming, that the apparatus may be comparatively expensive, and that gas analyses are required, the technique of which is not sufficiently simple for general clinical use.

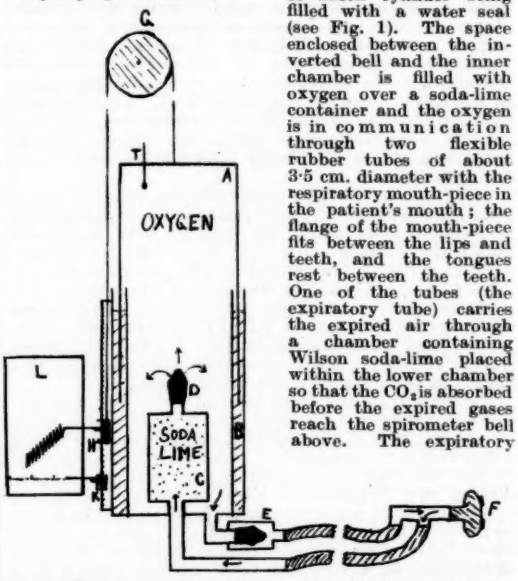
2. *The Closed Circuit Method.*—Principle: F. G. Benedict of Boston[10] has developed a portable respiration apparatus which measures the oxygen consumption of human beings directly, accurately, and rapidly. A relatively simple technique for the measurement of the oxygen consumption of man has been evolved which necessitates neither large respiration chambers, complicated valves, weighings, nor gas analyses; this is based on the observation that when a subject breathes pure oxygen the amount of oxygen taken up by the blood and used is the same as when ordinary air is inspired. This apparatus measures the oxygen only, for it has been shown that in ordinary work the oxygen consumption is of prime significance in the vast majority of pathological cases. Carpenter and Emmes make the statement that when the measurement of basal metabolism is desired, it is waste of time to attempt any other measurement than that of oxygen consumption supplemented by the controls they have recommended.[11] These observers with Hendry[11] state that when the oxygen consumption alone is desired the Benedict apparatus is the best apparatus for short period measurements. Again, where one gas is measured the absorption of oxygen is less affected by abnormalities of respiration than is the production of carbon dioxide.

In the original apparatus and modifications an electric fan (impeller) was placed within the spirometer bell in order to drive the gases within the closed circuit through a soda-lime container so that the carbon dioxide might be absorbed and the gas sent in respirable condition to the mouth of the patient. This electric impeller is apt to get out of order, to heat the circuit at times, and its noise is apt to disturb the patient; it is omitted in the Roth-Benedict apparatus[12] and the original electric impeller and face-mask are replaced by simple rubber valves and a mouth-piece.

The Roth-Benedict Apparatus.

The Roth-Benedict apparatus consists of a spirometer bell, cylindrical in shape (bearing a thermometer at the upper closed end), accurately counterpoised over a pulley and suspended over a double-walled cylinder closed below, the space between the vertical walls of which cylinder being filled with a water seal (see Fig. 1). The space enclosed between the inverted bell and the inner chamber is filled with oxygen over a soda-lime container and the oxygen is in communication through two flexible rubber tubes of about 3·5 cm. diameter with the respiratory mouth-piece in the patient's mouth; the flange of the mouth-piece fits between the lips and teeth, and the tongues rest between the teeth. One of the tubes (the expiratory tube) carries the expired air through a chamber containing Wilson soda-lime placed within the lower chamber so that the CO_2 is absorbed before the expired gases reach the spirometer bell above. The expiratory valve (which shuts at inspiration) is placed on top of the soda-lime chamber, and the inspiratory valve (which shuts on expiration) is situated in a special housing at the end of the inspiratory tube below the body of the apparatus. In this way, when the nose is closed with a nose-clip and the patient connected up with the apparatus, he expires into the spirometer chamber (the spirometer bell rising) through soda-lime where the CO_2 is absorbed, and he inspires pure oxygen from the bell (the bell falling) with a minimum of frictional resistance. Thus, the oxygen consumed over a given time can be measured accurately by a scale adjacent to the counterpoise weight which carries a pointer running on the scale—the pointer falls and rises as the bell rises and falls; or, if a pen is attached to the weight or pointer and allowed to write on a revolving drum with a suitable time-marker (Roth) the test can be recorded and the oxygen consumption measured graphically.[13] The volume of the oxygen consumed in a given time is then corrected to normal temperature, pressure, and for relative humidity (80 per cent.) according to the laws of Charles or Gay-Lussac, Boyle and Dalton. The Roth-Benedict apparatus is used by the present writer. Prof. Krogh of

FIG. 1.—*Diagram of the Roth-Benedict Apparatus with Kymograph Attachment.*



A, spirometer bell; B, water seal; C, soda-lime container; D, expiratory valve; E, inspiratory valve in its housing; F, mouth-piece; G, pulley; H, counterpoise weight, pointer, and kymograph pen-writing tracing; K, time-marker; L, kymograph; T, thermometer.

Copenhagen has also independently devised a clinical apparatus similar in principle to the Roth-Benedict.*

Having determined the oxygen consumption, this must be compared with standards of oxygen consumption of normal persons of the same size, shape, age, and sex, in order to estimate whether the oxidation processes of the organism, and therefore the basal metabolic rate, are greater or less than normal. Rubner [14] suggested that the heat production of an individual was proportional to his *surface area*, and E. F. and D. Du Bois[15] devised a linear formula based on height and weight, after the most careful measurements, whereby the body surface could be calculated with an average error of under 2 per cent. Later D. Du Bois devised a simple though slightly less accurate (±5 per cent.) formula which is:—

$$\text{Surface area} = W^{0.425} \times H^{0.725} \times 71.84,$$

where W = weight in kilogrammes and H = height in centimetres.

On the basis of this formula Du Bois then constructed a height-weight chart by means of which the surface area could be estimated at a glance, and, by using such a chart in conjunction with his standards of normal basal metabolism for age and sex, Du Bois showed that the metabolism of normal adults per square metre of body surface could be predicted with an accuracy of 10 per cent. The height-weight chart of Boothby and Sandiford† is convenient to use; a straight-edge joining the weight and height figures cuts the centre line at the figure for body surface. Benedict [16] criticised this method on the ground that the heat output of the body at rest does not depend on Newton's law of cooling and is therefore not proportional to body surface; consequently Harris and Benedict [17] compiled standards based on weight, age, sex, and height, but the results obtained by using both sets of standards do not differ very markedly (6·5 per cent. higher by Harris-Benedict method). Other standards were devised by Dreyer,[18] and Benedict and Talbot [19] have compiled standards for boys and girls based on weight, and Benedict and Hendry [20] for girls at the age of puberty based on age and weight. Boothby and Sandiford [21] conclude that the Aub-Du Bois standards give the best method available at present for predicting the normal heat production. The best standards for boys and girls ranging in weight from 2·5 to 38 kg. seem to be those of Benedict and Talbot (see Table I).

TABLE I.—*Basal Heat Production Standards.*[22]

(A) *Benedict-Talbot Standards for Boys and Girls.*

Calories per kilogramme per hour predicted from body-weight.

Weight (kilos.).	Boys (cal.).	Girls (cal.).	Weight (kilos.).	Boys (cal.).	Girls (cal.).	Weight (kilos.).	Boys (cal.).	Girls (cal.).
1	—	—	21	36·9	34·6	41	For boys use "Aub-Du Bois" B, or "Harris-Benedict" standards D.	51·2
2	—	—	22	37·9	35·6	42		51·3
3	6·3	6·3	23	39·2	36·7	43		51·4
4	8·8	9·2	24	40·2	37·5	44		51·6
5	11·3	11·9	25	41·3	38·8	45		51·7
6	13·8	14·6	26	42·5	39·6	46		51·8
7	16·3	16·9	27	43·5	40·6	47		52·0
8	18·5	19·2	28	44·6	41·7	48		52·1
9	20·6	20·8	29	45·4	42·5	49		52·3
10	22·7	22·5	30	46·5	43·5	50		52·4
11	24·6	24·2	31	47·5	44·6	51		52·5
12	26·0	25·4	32	48·3	45·4	52		52·7
13	27·5	26·7	33	49·2	46·4*a*	53		52·8
14	29·0	27·7	34	50·0	47·3*a*	54		52·9
15	30·2	28·8	35	50·8	48·3*a*	55		53·1
16	31·5	29·6	36	51·7	49·2*a*	56		53·2
17	32·5	30·6	37	52·3	50·1*a*	57		53·3
18	33·5	31·7	38	53·1	50·7	58		53·5
19	34·6	32·5	39	—	50·8	59		—
20	35·8	33·5	40	—	51·0	60		—

(*a*) = Figures based on general trend of table. Not in original.

(B) *Aub–Du Bois Standards.*

Cal. per sq.m. of body surface (height-weight formula) per hour.

Age.	Males.	Females.
8 to 9	54·0	54·0
10 to 11	51·5	50·0
12 to 13	50·0	46·5
14 to 15	46·0	43·0
16 to 17	43·0	40·0
18 to 19	41·0	38·0
20 to 29	39·5	37·0
30 to 39	39·5	36·5
40 to 49	38·5	36·0
50 to 59	37·5	35·0
60 to 69	36·5	34·0
70 to 80	35·5	33·0

(C) *Benedict-Hendry-Baker Standards for Girls 12 to 17 years of age.*

Cal. per kilogramme per hour predicted from age.

Age.	Cal.
12	1·29
12½	1·25
13	1·20
13½	1·15
14	1·11
14½	1·07
15	1·02
15½	0·98
16	0·94
16½	0·90
17	0·88

(D) *Harris-Benedict Standard Formulas.*

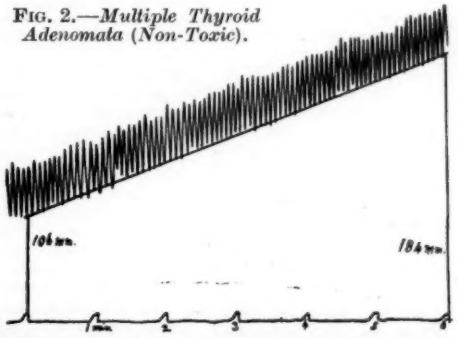
For Males (applicable to boys back to 10 kilos. in weight).
$H = 66{\cdot}473 + 13{\cdot}752\,w + 5{\cdot}003\,s - 6{\cdot}755\,a.$

For Women (for ages not under 21 years).
$H = 655{\cdot}096 + 9{\cdot}563\,w + 1{\cdot}850\,s - 4{\cdot}676\,a.$

H = heat production, cal. per 24 hrs. w = weight in kilos.
s = stature in centimetres. a = age in years.

Graphic Method (Roth, see Figs. 2, 3, and 4).—The mouthpiece and conducting tubes having been cleansed and sterilised, the apparatus is assembled. The sealing chamber is filled with water to within a few inches of the top. The absorbing chamber is filled with suitable granular soda-lime (Wilson brand is recommended). The charge of soda-lime can usually be used for several tests, and should be changed when it ceases completely to absorb CO_2, as shown by bubbling a sample of the air in the spirometer at the end of a test through baryta water by means of a tube connected to a small stopcock placed in the bottom of the respiration chamber. A test thus showing unabsorbed CO_2 should be discarded. After filling the soda-lime container its cover is sealed with a rubber band, and the rubber flutter valve on the cover is examined to see that the lateral slits come *barely* in contact with each other. This may be regulated by

FIG. 2.—*Multiple Thyroid Adenomata (Non-Toxic).*



Case H. B.—Female, aged 44. P., 86; T., 98·5° F.; R., 20 (B). P., 73; T., 98·6°; R., 20 (E). Spiro. T., 11·5° C. (B), 11·5° C. (E). Wt., 151 lb. = 68·6 kg.; Ht., 63 in. Bar., 754 mm. Hg. O_2 line = cals. per hr. = 184 − 106 = 78 mm.; corrected cals. per hr. = 78 × 0·952 = 74·2 (N.T.P.). Area body surface = 2·02 sq. m. (= 2); cals. per sq. m. per hr. = 36·7 (= 37). Average normal cals. per sq. m. per hr. = 36 (Aub and Du Bois). B.M.R. = −2·7 % (= −3 %).

B = just before test. E = just after test.

drawing the valve more or less over the metal tube. If properly adjusted the rubber valves are almost noiseless and never stick if clean. The soda-lime container is then tightly screwed in position within the inner chamber. The inspiratory valve is also examined prior to the test. Any water of condensation that collects in the lower expiratory tube should be drained away after the test as necessity for so doing arises. The respiration chamber is filled to the required degree with oxygen with a cork blocking the mouth-piece, and the apparatus is tested for leaks by placing a weight on the spirometer bell and noting whether the pointer rises after a few moments. The operator should himself use the apparatus before the test for a few moments—the connexions can be cleansed before use with the patient or a fresh set used. The fasting (15 hours) patient is reclining and resting comfortably, fully relaxed, for at least

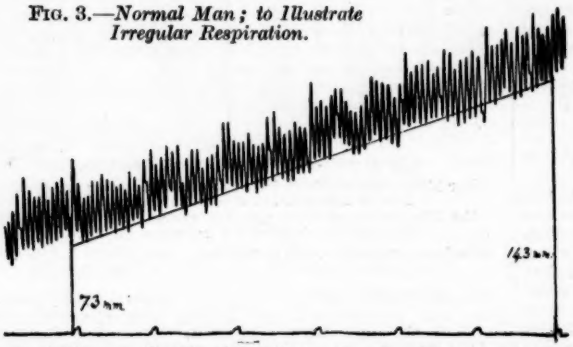
* The Roth-Benedict apparatus may be obtained from Mr. Warren E. Collins, 584, Huntington Avenue, Boston, Mass., U.S.A., and it and the Krogh form from H. E. Kendrick, 3, Morley-avenue, Higham's Park, London, E. 4. The Sanborn Company have a modification on the market also obtainable through Mr. Kendrick.

† Given in the author's reprints.

half an hour on the couch beside the apparatus before the test; he should not smoke on the morning of the test; he is protected from the cold or visitors, and kept as quiet as possible. He is instructed beforehand as to the nature and requirements of the test in order to gain his confidence and ensure coöperation. His pulse and respiration rates are noted several times during the half-hour rest and his temperature taken. When all is ready the cork is removed, and the mouth-piece is inserted in the patient's mouth with the two lugs between the teeth and the oral flange between the lips and the nose-clip is applied. Then, after a few minutes, the kymograph is brought into contact with the recording pens, and the respiratory movements of the bell are recorded above the time tracing on the paper of the revolving drum. The upward tendency of the tracing denotes oxygen consumption. The spirometer temperature is noted at the beginning and end of the tracing, and a tracing of about ten minutes' duration is recorded. After a rest the test can be repeated if desired.

Roth states that a kymograph record of the movements of the spirometer bell taken during a test simultaneously with a graphic time record (see Figs. 2 to 4) is the most accurate basis for the measurement of the oxygen consumption of the subject by the method of indirect calorimetry. Further, not only is a permanent record of the test secured, but the oxygen consumption can be more easily and accurately measured by the graphic method than by the method of direct readings indicated by the moving pointer against the millimetre scale, especially with subjects who breathe irregularly. Again, no disturbance of any significance for the interpretation of the test can occur to the patient during the test without affecting the respiration in a manner readily detected from the tracing. Not infrequently, also, the test is started before the patient has returned to the basal condition which a 30-minute preliminary rest period is intended to ensure, but which is apt to be more or less disturbed in the process of starting the test; if, as a result, the metabolic rate has been temporarily increased the respiration curve will readily show it, and any portion of the tracing which does not represent the probable basal metabolic rate of the subject can be disregarded in the measurements. It is better to base the calculation on a short undisturbed period of only four or five minutes than on a larger one which includes vitiated sections. For example, consciousness of the patient of his own respirations, often intensified by his effort to breathe correctly, may cause the degree of expansion of the lungs to vary considerably; such a source of error will generally be revealed by the kymograph, but might readily otherwise pass undetected and introduce a considerable error.

FIG. 3.—*Normal Man; to Illustrate Irregular Respiration.*



Aged 42 yrs. P., 70; T., 97·4° F.; R., 20. Spiro. T. at B = 10° C.; at E = 11° C. (10·5° C. = av.). Bar., 771 mm. Hg; Ht. = 66 in.; Wt. = 168 lb. O_2 line = cals. per hr. = 143 − 73 = 70 mm.; corrected cals. per hr. = 70 × 0·977 = 68·39 (= 68·4). Body surface = 1·85 sq. m.; cals. per sq. m. per hr. = 36·97 (= 37). Average normal cals. per sq. m. per hr. = 38·5 (Aub and Du Bois). B.M.R. = −4·16 % = −4 %.
If O_2 line = 70 + 4, B.M.R. = + 1. If O_2 line = 70 − 4, B.M.R. = −9.

Roth states that further advantages of his graphic method are as follow:—

"It simplifies the technique. It reduces to a minimum the necessary procedures. There are no spirometer readings to be made. Stop-watches can be dispensed with. The kymograph automatically records the time, the oxygen consumption, and, to a large extent as well, the working condition of the apparatus and the behaviour of the subject. The average respiration count per minute is most conveniently obtained from the tracing. One operator only is needed to supervise the entire operation, including the counting of the pulse, to observe the spirometer temperature and the barometric pressure, while at the same time an occasional glance at the kymograph keeps him informed as to whether the test is progressing under desirable conditions. The computations, as ordinarily carried out, are naturally reduced if based on the graph which, furthermore, allows the full advantages presented in the considerably simplified system of calculation presented."

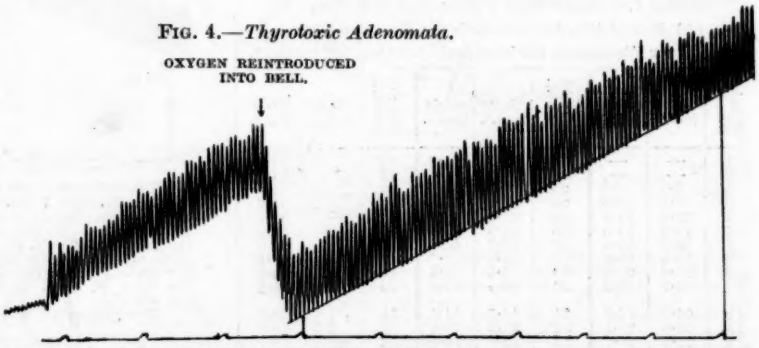
It is to be noted that direct readings from the scale when no graph is used make the test more laborious.

Calculations.

The object desired is the determination of the percentage increase or decrease of the metabolic rate of the subject as compared with the accepted average normal standards which are expressed (Du Bois) in terms of calories used per square metre of body surface per hour. In clinical work the calories elaborated by the patient are calculated from the amount of oxygen he has absorbed during the time of the test; one litre of oxygen absorbed = 4·825 calories; this figure varies slightly according to the proportion of fats, proteins, and carbohydrates oxidised by the subject, but in practical clinical tests the average calculated calorific value of oxygen is sufficiently accurate—i.e., 4·825 calories per litre of oxygen—assuming 0·82 as the average respiratory quotient.

For very accurate measurement of the heat production the measurement of both respiratory gases is necessary, because the heat value of the unit quantity of oxygen or carbon dioxide varies according to the nature of the foodstuff oxidised. When fat is burned

FIG. 4.—*Thyrotoxic Adenomata.*



Aged 37 yrs. Wt., 51 kg.; Ht., 169 cm.; Bar. = 768 mm. Hg. Temp. of spiro. 14° C. Temp. of patient: Before, 97° F.; after, 97·4°. Pulse: Before, 84; after, 82. Respir.: Before, 24; after, 22. O_2 line = 157 − 40·5 = 117 mm. = cals. per hr.; corrected = 117 × 0·941 = 101 cals. per hr. Body surface = 1·57 sq. m.; cals. per sq. m. per hr. = 64·3. Average normal cals. per sq. m. per hr. (Du Bois) = 36·5. B.M.R. = + 76 per cent.

the heat value of one litre of oxygen is 4·686 calories; when carbohydrate is oxidised the heat value is 5·047 and the protein value is 4·485. Thus, the heat generated as calculated from oxygen consumption or carbon-dioxide production varies with the non-protein respiratory quotient which normally lies between 0·71 for fat and 1·0 for carbohydrate, and to determine the respiratory quotient both gases must be measured. The non-protein respiratory quotient is derived by calculation from a knowledge of the urinary nitrogen excretion over a given period.

The actual oxygen consumption is determined from the fall in the spirometer bell in millimetres as indicated by the pointer on the scale or the rise of the tracing. To shorten the calculation (Roth) a section of the tracing of one-tenth of an hour (six minutes) is taken and the bell is constructed with a volume of 20·73 c.cm. per mm. of its height. Thus, each millimetre fall of the bell or rise of the tracing (rise of the O_2 line) in a six-minute period represents one calorie per hour:—

1 mm. in 6 minutes = 20·73 c.cm.
∴ O_2 = 207·3 c.cm. = 0·2073 litre per hour.
0·2073 × 4·825 = 1 calorie per hour.

The consumption of oxygen is measured by drawing an average line along the base of the respiration curve, dropping two perpendiculars to the base line at the beginning and end of the six minutes period and measuring the height of the perpendiculars; the difference in mm. represents calories per hour. This figure, which represents the volume of oxygen used by the subject in six minutes, is next corrected for the spirometer temperature, barometric pressure, and humidity (80 per cent., using Wilson soda-lime) by multiplying by a factor obtained from a table.[22]‡ The average spirometer temperature is taken from temperature readings recorded at the beginning and end of the test. A change in temperature of less than 1° C. can be ignored, but if a rise of more than 1° C. is noted allowance is made by adding for each degree centigrade of rise of temperature 0·5 millimetre to the total rise of the O_2 line in six minutes.

The next step is the calculation of the calories produced per square metre of body surface; the body-surface area is read directly from the Boothby and Sandiford chart [23] by laying a straight-edge across the figure joining the weight in kilogrammes and the height in centimetres. The figure representing calories per square metre of body surface per hour is compared with the average normal number of calories per square metre per hour obtained from the tables of normal standards (Table I.), and the percentage increase or decrease noted. The latter is given as the basal metabolic rate.

The normal zone of basal metabolism for male adults and non-pregnant women is usually taken to lie between ± 10 per cent., but with ambulatory patients it may be taken to lie between ±15 per cent. The basal metabolism of children probably varies within a still wider range.

CONDITIONS NECESSARY FOR A SUCCESSFUL TEST.

The following conditions on the part of the patient are necessary for a successful test: (*a*) Complete coöperation and absence of apprehension concerning the test—the test is often 10 per cent. higher than it should be when the patient is nervous and apprehensive; (*b*) the test should be performed in the morning with the patient in the post-absorption state—that is, having had a light supper the previous night and no food for at least 14 hours prior to the test; (*c*) muscular relaxation§; (*d*) a preliminary rest period of at least 30 minutes in a comfortably warm room with the subject in the reclining position on the test couch; (*e*) body temperature within normal limits; (*f*) the respirations should be reasonably regular during the test, but irregularity of the respiration rhythm or depth is more apt to affect the CO_2 excretion than the oxygen absorption.

‡ Given in the author's reprints.

§ Grafe studied various forms of tremor and concluded that the metabolism is increased only if the tremors are very marked and that emotion increases the metabolic rate (quoted by Du Bois [24]).

Interpretation.

The test should be interpreted in relation to the history, clinical condition, and physical examination of the patient and it cannot and should not be evaluated by itself alone. McCann[9] writes:—

"If the basal metabolism is determined by the most accurate technique, under rigidly controlled conditions, a deviation from the average normal can be properly interpreted only in the light of the most thorough and painstaking clinical study of the case. In the last analysis a diagnosis must rest upon the clinical observations. As an unbiased objective method of evaluating the results of therapeutic measures in thyroid disease, especially as a means of controlling the treatment of hypothyroidism, basal metabolism determinations are invaluable. . . . Metabolism determinations are unsurpassed as an objective means of measuring the severity of hyperthyroidism or hypothyroidism and the response to various forms of treatment."

Du Bois [25] writes:—

"There seems to be a striking unanimity of opinion that the level of the basal metabolism is the best guide to the activity of the thyroid gland. This has a sound physiological and clinical basis. We must remember, however, that we are dealing with a laboratory test, and that it must not be accepted blindly. There are certain limitations which should be emphasised at this point. The technic is difficult, and errors of 10 or 20 per cent. may be made, especially by beginners. Even in the best hands there is a possible error of 2 or 3 per cent. In addition to this there are rather wide fluctuations in the daily metabolism of certain individuals. The first few tests with a thyroid patient may be 10 or 20 per cent. too high. Some normal individuals consistently show rates 10 to 15 per cent. or even more above or below the normal. The chances are that these various sources of error will partially neutralise each other, but if they all happen to fall in the same direction the result will be far from the truth.

"In every disease there is a tendency to variation from the typical which occurs in certain individuals, and there are few hard-and-fast rules in diagnosis. It is very seldom that we should allow any single symptom or laboratory test to outweigh a mass of evidence. A slavish adherence to the basal metabolism test as an index of diagnosis may lead the physician to trouble, first because the test does not always give the true basal metabolism, and second because even the true basal metabolism is not always the indication of the correct diagnosis. God forbid that we make our diagnoses by machinery!"

The basal metabolism may be notably increased in fevers, hyperthyroidism (Graves's disease, thyrotoxic adenomata, and some cases of malignant tumour of the thyroid and thyroiditis, overdose of thyroid substance or thyroxin), many cases of severe anæmias, many cases of chronic leukæmias, after food ingestion, from muscular work and in some cases of hyperpituitarism. The administration of insulin and suprarenal extract usually causes some increase in the basal metabolic rate. The basal metabolic rate may be notably decreased below the normal limits in hypothyroidism, in the clinical conditions myxœdema and cretinism, in traumatic shock, and in chronic inanition.

It is in diseases of the thyroid gland that the determination of the basal metabolic rate is of most value in clinical medicine. From an analysis of over 6000 thyroid cases Boothby and Sandiford [24] state that 98 per cent. of cases of exophthalmic goitre have a basal metabolic rate of over 10 per cent. above the average normal values of Du Bois and Aub, and only 7 per cent. were within the limits of ± 15 per cent.; 56 per cent. of cases of thyroid adenomata showed evidences of hyperthyroidism with a basal metabolic rate of more than 10 per cent. above normal; the vast majority of colloid goitre cases showed a normal rate and a few showed an increase up to 20 per cent. above normal.

According to Kessel, et alia,[26] cases which show the "sympathomimetic" symptoms of Graves's syndrome (tachycardia, tremor, exophthalmos, asthenia, diarrhœa, sweating) without increase of the basal metabolic rate and without goitre are to be considered not cases of hyperthyroidism but

of "autonomic imbalance." These cases are called "border-line" cases by Means.

DIAGNOSTIC VALUE OF BASAL METABOLIC RATE.

The use of the determination of the basal metabolic rate in the diagnosis of thyroid disease is stated as follows by Means and Burgess[26]:—

"Patients with an outspoken picture of hyperthyroidism invariably show increased metabolism, and those with definite clinical pictures of hypothyroidism invariably show decreased metabolism. Those with goitres, but no signs or symptoms of abnormal thyroid function, for the most part show normal metabolism.

"By inference from the indirect evidence we believe that in these border-line thyroid cases, provided that in the first place a true basal rate is secured, and, provided that certain well-recognised causes for increased metabolism, such as fevers, acromegaly, leukæmia, and severe anæmia, are excluded, the finding of increased basal metabolic rate is strong presumptive evidence of hyperthyroidism. In a similar way, provided that such conditions as starvation, hypopituitarism, and hyposuprarenalism are excluded, a low metabolic rate is strong presumptive evidence of hypothyroidism.

"To that extent, then, the metabolism test is distinctly useful in differential diagnosis. Like all other laboratory tests it should only be interpreted with due regard to all other clinical and laboratory findings, and with due regard for its limitations and pitfalls."

From our own limited experience and from a study of the literature on the subject we have concluded that the test gives useful information for estimating the degree of thyroid deficiency, of thyrotoxicosis and the results of treatment, that it gives considerable information in the differential diagnosis of mild and doubtful cases suspected to have hyper- or hypothyroidism, but that it is not of great value in the diagnosis of frank cases of hyperthyroidism, myxœdema, or cretinism.

A summary of illustrative cases and cases of special interest are given in tabular form (Tables II. and III.).

TABLE II.—*Summary of Illustrative Cases.*

No. of cases.	Clinical type.	Basal metabolic rate—per cent.		
		Max.	Min.	Aver.
8	Normals.	+11	−3	+3
9	Adolescent and non-toxic parenchymatous or colloid goitres.	+21	−3	+5
2	Non-toxic thyroid adenomata.	+4	−3	—
4	Toxic thyroid adenomata.	+96	+18	+56
5	Frank cases of Graves's disease.	+67	+23	+49
2	Diabetes mellitus.	+11	+10	—
1	Cerebellar disease (with asynergia)—poor coöperation at test. Suggestion of myxœdema disproved by test.	+23	—	—
1	Obesity, "essential" vascular hypertension, imperfect carbohydrate utilisation, tremor, very "nervous."	+8	—	—

In addition to the cases studied from my own wards I desire to thank my medical and surgical colleagues of my own and other hospitals for sending cases for the test.

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TABLE III.—*Summary of Additional Cases of Special Interest.*

	B.M.R. per cent.
CASE 1.—Male, aged 18. Non-toxic parenchymatous goitre with colloid cysts	+12
After 0·2 mg. thyroxin by mouth for ten days showed fine tremor, nervousness, moist skin, and pulse of 92 to 96 per minute	+41
CASE 2.—Female, aged 17. Tremor; tachycardia (120); thyroid appears "full"; slight lag of upper lid; no exophthalmos; heart normal	+19
CASE 3.—Male, aged 30. Slight uniform enlargement of thyroid, tires easily, some palpitation on effort; some tremor; moist skin; heart, lungs, and abdominal organs normal; constipation; polyuria, urine and kidneys normal; blood-sugar normal; loss of weight; rather "nervous"; no hyperthyroid eye signs. Tendon reflexes brisk. B.P. 120/80; pulse 70 at rest, 90 to 100 after moderate exertion—does not return to normal rate for several minutes. Apparently, a "border-line" case—"autonomic imbalance"	+0·5 normal
CASE 4.—Male, aged 22. Uniform thyroid enlargement, tremor on excitement, occasional diarrhœa, moist skin; pulse averages 80, but goes up to 90 on slight exertion; slight exophthalmos (?); moist cyanotic hands. Clinically very mild thyrotoxicosis (perhaps in remission) or "autonomic imbalance"	−6
CASE 5.—Female, aged 47. Exophthalmic goitre. Frank case of thyrotoxicosis. Her local physician had been giving her thyroid substance by mouth for three weeks	+133
After stopping thyroid medication and rest for ten days	+47
CASE 6.—Male, aged 35. Exophthalmic goitre; frank case, heart enlarged; marked eye signs	+61
After nine months' treatment (rest, general hygiene, X ray) is clinically much improved and able to work but still has thyroid swelling; exophthalmos slightly improved	+18
CASE 7.—Female, aged 39. Frank case of Graves's disease	+97
After rest in bed for two weeks and a few X ray exposures	+64
After a further 13 days' rest in bed and 30 minims of liq. iodi co. (U.S.P.) by mouth per day, patient was clinically much improved; exophthalmos greatly reduced (see below (*a*))	+48
CASE 8.—Female, aged 46. Frank case of Graves's disease. Marked exophthalmos, moderate thyroid enlargement; slight tremor. Moist skin and says she perspires too easily; pulse averages 86, no diarrhœa or constipation and no menstrual disturbance. Clinically mild thyrotoxicosis	+68
After 15 days of liq. iodi co., ♏ xv. t.i.d., by mouth, and partial rest in bed. Clinically much improved; exophthalmos only slight and tremor very slight (see below (*a*))	+1
CASE 9.—Male, aged 23. Clinically, prior to tests, looked on as an "effort syndrome" or "autonomic imbalance" case. Tires easily; palpitation on exertion; pulse at rest averages 80, but goes up to 110 or 120 on moderate exercise and does not return to normal rate for several minutes afterwards; can feel his heart beating forcibly on slight exertion; hands and feet cyanotic and show loss of tone of skin vessels; marked tremor of hands and legs, especially on left side; periodic diarrhœa; can concentrate on mental work for short periods only; no abnormal thyroid enlargement and no accessory thyroids discovered (thyroid appeared slightly full at last examination); blood-sugar normal; very "nervous." Cerebro-spinal nervous system normal except for brisk tendon reflexes. Had no treatment during the ten months of observation except sedatives and change to the country. No evidence of thymus enlargement by X rays or otherwise. The case is evidently one of hyperthyroidism	+32 (*b*) +56 (*b*) +41 (*b*) +65 (*b*) +77 (*b*) +58 (*b*) +58 (*b*)
After 30 minims of Lugol's solution by mouth for 25 days (see below (*a*)); improved	+33
CASE 10.—Male, aged 17½. Fröhlich's syndrome (hypothyroidism) with diminished glucose tolerance (by courtesy of Dr. Leonard Abrahamson)	Exactly normal
CASE 11.—Female, aged 50. Paralysis agitans with pronounced tremor. Patient very apprehensive owing to psychical disturbance	+30
Second test with patient calm	+11
CASE 12.—Female, aged 19. Intellectually deficient; dry scaly skin, hair of head has been falling out; partially deaf; some pigmentation of skin of forearms. Question of hypothyroidism in diagnosis disproved by test	+13

(*a*) It is not intended to convey the impression that the effect of iodine, in benefiting cases of Graves's disease, is permanent.
(*b*) Tests given in order during the ten months of observation.

PARA-SMALLPOX [1]

(SYNONYMS ALASTRIM, AMAAS), AN ACUTE SPECIFIC INFECTIOUS DISEASE DISTINCT FROM SMALL-POX.

BY R. P. GARROW, M.D. ABERD., D.P.H.,
MEDICAL OFFICER OF HEALTH, CHESTERFIELD.

IT is a matter of common knowledge that there has prevailed during the last few years in certain districts in England, chiefly in the Midlands and north, a disease notifiable as "small-pox." This disease presents clinical and epidemiological features which distinguish it from virulent small-pox as commonly observed in England in recent times and as described in standard English text-books of medicine and in Ricketts and Byles' classical monograph the "Diagnosis of Small-pox."

The features which distinguish the prevailing disease from classical small-pox are so numerous, so striking, and so constant, and their practical significance to physician, epidemiologist, public health administrator, and public is so important that in the following clinical description I have adopted [2] "para-smallpox" as its name in order to facilitate comparison and contrast between it and the graver disease small-pox.

The disease is, in all probability (?), the same as that known in South Africa as "amaas" (the Kaffir word for sour milk), and in South America as "alastrim" (from the Portuguese *alaster*, meaning "to strew over"), but inasmuch as these foreign names have no obvious meaning in English, I prefer "para-smallpox"—a name which at once conveys the meaning "a disease closely allied to small-pox." The coining of a new name is not intended to suggest the discovery of a new disease, but merely to indicate its recognition as a definite clinical entity—an acute specific infectious disease separate and distinct from small-pox—a disease, moreover, which is fixed in type and does not tend to assume virulence and acquire the death-dealing and disfiguring properties of small-pox.

Personal Experience.

The clinical description of para-smallpox which follows and its contrast with small-pox are based entirely on personal observation of 500 cases occurring in the borough of Chesterfield between October, 1923, and July, 1924, before and during their isolation at Spital and Morton small-pox hospitals. The data were all collected by myself from these patients and their relatives. Any personal error involved therefore is mine, and not that of the ambulance nurse or sanitary inspector or other person concerned with the outbreak. Thanks to the kindness of colleagues in Derbyshire and elsewhere, I had opportunities for studying para-smallpox for two and a half years previous to its appearance in the borough of Chesterfield. For example, I am indebted to Dr. Herbert Peck, medical officer of health, Chesterfield rural district, for the opportunity of observing cases from North-East Derbyshire. I have also visited Ilkeston, Long Eaton, Doncaster, Gloucester, Middlesbrough, and other towns where the same or a similar mild disease has prevailed, and I am grateful to medical officers of health and medical superintendents of small-pox hospitals in these towns for permission to see their patients.

My experience of classical small-pox is confined to cases seen in the East during the war, but owing to the kindness of Dr. A. F. Cameron, medical superintendent, small-pox hospital, Dartford, I was enabled to refresh my memory of that loathsome disease by a visit in 1922 to the patients from the Poplar epidemic.

Brief Clinical Description.

For brevity and, so far as it goes, accuracy, I cannot better the description of his disease given by a patient in three words: "pimples following influenza." In these words he brought out the three most remarkable clinical features of the disease—first, the primary toxæmia which was almost universally regarded by both patient and doctor as an ordinary attack of influenza; secondly, the focal lesion, which, smaller and more superficial in the skin than the eruption of small-pox, is accurately described as "pimples"; thirdly, the word "following" signifies one of the most striking features of the disease—namely, the fact that frequently the eruption appears after—it may be several days after—the patient has completely recovered from the initial illness.

Analysis of Clinical Signs and Symptoms of Para-smallpox with Special Reference to Comparison and Contrast with those of Small-pox.

1. *Onset.*—The onset of an average case of para-smallpox is gradual, with headache, dizziness, aches and pains in body and limbs, and weakness of legs. These are the commonest symptoms complained of. In addition, there may be shivering, nausea, vomiting, abdominal pain, backache, and sore-throat. No case in this series gave the classical onset of small-pox with rigor, vomiting, lumbo-sacral pain, and rapid prostration. Although not prostrated, the para-smallpox patient usually lies down to recover from what he calls influenza. His temperature in this stage is 100° to 103° F., and subsides by rapid lysis. The recovery from this initial illness is rapid and complete, and in the average case the patient feels perfectly well for the remainder of his attack, including the stage of eruption and convalescence. The influenzal illness leaves behind no feelings of physical weakness or mental depression such as frequently follow ordinary influenzal attacks.

2. *The Pause.*—Whereas in small-pox the eruption appears fairly constantly in the middle of the primary toxæmia—i.e., about the third or fourth day of the illness—in para-smallpox its appearance is frequently delayed till the patient has completely recovered, and in about one-third of the cases an interval of one to four days of complete intermission of all symptoms occurs between illness and rash. In this

TABLE I.—*Showing the Duration of the Prodromal Illness.*

Days from onset to eruption	No illness.	2	3	4	5	6	7	8	9	10
No. of cases	51	13	60	110	93	81	47	35	7	3
						173				

[1] A paper read to the Fever Hospital Group of the Society of Medical Officers of Health, London, Nov. 28th, 1924.
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(*Continued from previous page.*)

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quiescent period or pause patients have returned to school or to work for days. This change in the chronological relationship of the primary toxæmia and the eruption is one of the most striking differences between para-smallpox and small-pox. (Table I.)

In 173 cases, or rather more than one-third, the interval between onset and eruption was six to ten days.

3. *Eruption.*—The eruption of para-smallpox corresponds exactly with that of small-pox in one important respect—*distribution.* Every detail of observation made by Ricketts and Byles on small-pox in regard to the distribution of the rash may be confirmed in the case of para-smallpox. The skin lesions of para-smallpox are, however, on an average, smaller and more superficially situated, not so shotty, and *more rapid in their evolution through the stages of macule, papule, pustule to crust than those of small-pox.* The final stage usually referred to as scabs or crusts in small-pox may be more aptly called "amber beads" in para-smallpox. Instead of the opaque brown crusts formed of inspissated pus and blood seen in small-pox, the skin of the para-smallpox patient will be found studded with small round translucent bodies varying in size from pin's head to split pea, and in colour from pale straw to dark amber. These amber beads take their size and shape from the pustules which precede them, and may be perfectly dome-shaped or slightly flattened on the top. Their translucency indicates that the contents of the pustule was scarcely pus, but little more than clear or only slightly turbid serum. This *amber bead phenomenon* is best seen about the end of the first week from the appearance of the eruption, and lasts throughout the second week, when it is of great diagnostic help. A few amber beads of perfect shape and correct distribution have frequently been the only objective sign of an attack, and when supported by a history of "flu" a week or two before, are absolutely diagnostic. I have not seen similar skin lesions in any other condition. When the amber beads are shed from the skin there remain small, round, glistening reddish-brown areas which lose their pigmentation slowly and may be still visible some months after recovery from the attack. But pitting is rare, and when it occurs it consists of a fine foveation on the nose, cheeks, and forehead.

4. *Secondary Fever.*—When the eruption is profuse and the pustules are large and deeply situated in the skin as in small-pox (as they sometimes are), there is mild suppurative fever (100°–101°) in the second week, but this is rare, and the majority of patients never have an ache or a pain or a temperature above 99° after admission to hospital.

5. Other features associated with small-pox of great toxicity were not observed once in this series—namely, prodromal rashes; hæmorrhages. Further, newborn or very young infants, unprotected by vaccination, had hardly any constitutional disturbance, even when the rash was fairly copious. Infants on the breast never missed a feed, and the first thing noticed by the mother was the appearance on the infant of the characteristic spots.

Complications.

Apart from secondary infections of the skin like impetigo, &c., the only complications observed in this series were connected with the eyes. The ophthalmic complications are of great interest and importance. Three inflammatory conditions were seen.

1. *Blepharitis and Conjunctivitis.*—In quite a number of cases lesions occurred in the palpebral and ocular conjunctivæ. In some the margins of the lids were the seat of numerous pocks. These infected or irritated the conjunctiva, giving rise to acute purulent inflammation with considerable discomfort, but in every case recovery was complete without any permanent damage.

2. *Ulceration of Cornea.*—Three cases occurred in which a pustule formed at the corneo-scleral margin. When this pustule ruptured an ulcer formed at the periphery of the cornea and spread centripetally. This serpiginous ulcer was extremely slow in healing and left a small triangular opacity in the outer third of the cornea with its apex towards the centre and base on the periphery. There was no damage to vision.

3. *Keratitis Profunda.*—Two cases of this rare condition provided the most interesting and important of the eye complications of para-smallpox. Both occurred in the right eyes of very young infants—one 12 days old when the eruption appeared, the other aged 9 weeks.

CASE 1.—Female infant, born Dec. 6th, 1923. No prodromal illness. Rash appeared on the 18th—i.e., aged 12 days. Infected from the mother whose eruption appeared on the 10th. Baby successfully vaccinated on the 15th. The infant had a profuse eruption, but was not ill. It had some pustules about the eyes, and there was acute conjunctivitis of both eyes—more especially the right—with some pus. This cleared up under treatment, and mother and infant left hospital well on Jan. 9th, 1924. Three months later my attention was called to the baby's right eye. The upper half of the right cornea was ground-glass-like. There was no conjunctival or ciliary injection, and the pupil was normal in size, shape, and reactions. The baby was referred for treatment to the Royal Hospital.

CASE 2.—The interesting feature about the second case was that there was no indication of anything wrong with the infant's eye during its period of hospital isolation. It was not till a week after discharge from hospital that the mother noticed "a film over the baby's right eye." Male infant born on June 6th, 1924, rash appeared on August 9th without any prodromal illness. Admitted to hospital on August 12th. Discharged on the 30th after an ordinary attack without any eye trouble of any kind. A week after discharge from hospital the mother noticed a film coming over right eye and took the infant to me at the Health Office. The condition found was very similar to that described in the first case—upper half of right cornea steamy and ground-glass-like. My brother, Dr. A. Garrow, ophthalmic surgeon, Glasgow Royal Infirmary, happened to be with me in September, and I am indebted to him for the diagnosis of keratitis profunda in these two cases. Both cases are now under treatment by Mr. H. H. Emmerson, ophthalmic surgeon, Chesterfield Royal Hospital, who has kindly furnished me with the following reports, dated Oct. 14th, 1924.

Oct. 14th, 1924. 1st case. (Under ether.) Right eye; no ciliary or conjunctival injection; under atropine pupil dilates well and evenly; well-marked central opacity of cornea, definitely in the deeper layers; no vascularisation of cornea; fundi normal.

Oct. 14th, 1924. 2nd case. (Under ether.) No conjunctival or ciliary injection; under atropine pupil dilated well and evenly; upper two-thirds cornea cloudy, opacity in the deeper layers of the cornea; no vascularisation of cornea; fundi normal.

Mortality of Para-smallpox.

The mortality of para-smallpox in otherwise healthy subjects is nil. It does not convey an adequate impression of the mildness of this disease to say that no patient in this series of 500 cases or in the 2000 in the county of Derby died of para-smallpox. No case was sufficiently ill from para-smallpox to cause the slightest anxiety as to the issue.

In descriptions of the disease the mortality is usually stated as 1 or 2 per cent., but these deaths are frequently in very young infants or feeble old people, or result from some condition unconnected with para-smallpox. For example, although no case in this series died of para-smallpox, two of the patients died while in hospital—one from uræmic coma occurring in the course of chronic interstitial nephritis, the other from encephalitis lethargica. Another infant, aged 10 days on admission, died about a week after discharge from hospital from a cause unconnected with para-smallpox.

So far as I have been able to ascertain from the literature and from other sources of information, the 1 to 2 per cent. mortality attributed to this disease appears to be made up of similar deaths. My

own opinion is that the case mortality of para-smallpox is nil, or for all practical purposes nil—e.g., same as in mumps, rubella, varicella, &c. Extensive epidemics of this disease have been recorded running into thousands of cases without a death, and in other outbreaks the mortality figure amongst those attacked (including the deaths from prematurity, senility, &c., not properly attributable to para-smallpox) has actually been lower than the general mortality-rate from all causes amongst the population from which the cases were isolated.

From such statistics emerges the amazing paradox that this disease, far from being a cause of death, is actually to some extent a protection against the fatal issue! The suggestion is not so silly as it sounds, for if persons suffering from a harmless disease, never in itself fatal, are taken from overcrowded houses and bad hygienic conditions where they are ill-clad and poorly fed, to a place of safety where they are well fed and cared for, they are at least protected from some forms of death—e.g., death from violence—which in these days of rapid transport and crowded streets contributes materially to the general mortality-rate. It is not surprising therefore that the death-rate should be lower in para-smallpox than in the healthy.

Vaccination Statistics.

Table II. shows the influence of vaccination in the prevention of para-smallpox. No person vaccinated in infancy was attacked under the age of 17 years. No person recently vaccinated was attacked. No person vaccinated in infancy and revaccinated at any age was attacked.

TABLE II.—*Borough of Chesterfield. Vaccination State of Patients.*

Vaccinated and re-vaccinated: No person attacked.
Vaccinated recently: No person attacked.

Age-groups ..	0–5.	5–10.	10–15.	15–20.	20–25.	25–30.	30–40.	40–50.	50–60.	60 and over.	Total.
Vaccinated in infancy only..	—	—	—	3	5	5	8	38	25	5	89
Unvaccinated ..	65	82	95	72	51	20	17	5	3	1	411

Thirty cases vaccinated successfully after exposure to infection developed the disease. The number of days between successful vaccination and the appearance of the eruption is shown in Table III.

TABLE III.—*Showing Days Elapsing between Successful Vaccination and the Appearance of Eruption in 30 Cases developing Disease who were Vaccinated after Exposure to Infection.*

Interval (days).	3	4	5	6	7	8	9	10	11	12	13	14	15	16
No. of cases..	1	1	—	3	4	4	8	5	2	1	—	—	—	1
						21								

There are many who believe that the identity of this mild disease with small-pox is settled by this prophylactic influence of vaccination alone. In dissenting from this view I would remind them that even the discovery of the virus of small-pox and para-smallpox as identical organisms does not necessarily settle the question. A simple analogy will explain what I mean. The so-called *Micrococcus melitensis* (in reality a short bacillus), discovered by Bruce as the cause of Malta or Mediterranean or undulant fever in man, is quite indistinguishable to bacteriologists from the *Bacillus abortus* of Bang which causes contagious abortion in cattle. Yet nobody would think of suggesting that undulant fever and contagious abortion are the same disease.

Similarly, no discovery which the sciences of bacteriology and immunology may make in regard to small-pox and para-smallpox can bridge the wide clinical gulf between the two diseases.

Fixity of Type.

Granted that under the name small-pox there exist two diseases clinically distinguishable, the virulent disease commonly known as small-pox and this other mild avirulent and comparatively harmless disease which I have called para-smallpox, there still remains for discussion the crucial question: *Do these two diseases breed true to type indefinitely under all conditions? In other words, can the mild disease, para-smallpox, be trusted implicitly to remain mild and relatively harmless, and never under any circumstances, known or unknown, assume the virulence of small-pox?*

It is unnecessary to emphasise the practical importance of a correct answer to this question. Upon the answer depends administrative action influencing the lives of thousands of sufferers from the disease and involving the expenditure of large sums of public money. It is necessary to examine the evidence with an unbiased mind, and, above all things, to avoid confusing the issue with the vexed question of vaccination. So far as experience in Derbyshire goes, the answer is in the affirmative. During four summers and three winters the disease has preserved the same average level of virulence. The cases in hospital to-day are exactly the same as those seen three and a half years ago. The same fixity of type has characterised other extensive outbreaks of this disease at home and abroad.

Under these circumstances how does it come about that the view of the majority, and more particularly the official view, is that this disease is merely small-pox of depressed virulence which may and does, under largely unknown circumstances, revert to a virulent type and become classical small-pox? Let us examine the evidence on which this view is based—i.e., the occasions on which the mild disease is alleged to have acquired the virulence of small-pox.

Criticism of the American Evidence.

Those who believe in the power of mild disease to acquire the virulence of small-pox frequently point to the course of events in America, where small-pox is stated to be resuming its severe form after a period of extreme mildness and low mortality. It seems to be forgotten that this change is readily explained on the hypothesis of a change in the relative incidence of two diseases, one of which is mild with a mortality of nil, and the other severe with a mortality of anything up to 40 per cent. By mixing these diseases in varying proportions you can obtain a total case-mortality-rate of any figure from nil to 40 per cent. This explanation of the American experience is just as reasonable as the hypothesis that the increasing mortality from small-pox in America is due to the enhanced virulence of a single disease.

Let us examine more closely a specific instance in the American epidemiology of small-pox of "the mild type suddenly assuming virulence"—namely, the outbreak at Windsor, Ontario, in the early part of 1924. The English journal, the *Medical Officer*, of April 5th, 1924, devotes an editorial article to a commentary on the official circular of the Provincial Board of Health of Ontario, issued to the medical officer of health of the province. The article says:—

> "It appears that in the last quarter of 1923 there was a mild epidemic of small-pox in Detroit, on the other side of the boundary between Canada and the United States, whence cases were traced to the Canadian border towns, including Windsor, where there occurred in February a fatal case of hæmorrhagic small-pox in an unvaccinated man, which was not, however, definitely diagnosed as such until after his death, and when persons who had been in contact with him were taken ill with the disease in a particularly virulent form. Up to March 3rd there were 40 cases with 12 deaths in Windsor, and in the adjoining districts there were 20 cases, 6 of which proved fatal. As many as 42 cases were traced to the undiagnosed case, the origin of which, however, it was not found possible definitely to determine; in all probability it was due to the Detroit outbreak, an instance of a mild type suddenly assuming virulence."

The official circular from which this description is culled mentions an alternative source of infection—namely, "the northern part of the province where irregular types of small-pox are often seen." This is omitted in the *Medical Officer's* commentary. Another significant fact, inadvertently omitted from the article referred to, is mentioned in the official circular in giving a classification of the Windsor cases, viz. :—

(*a*) Mild cases in individuals with a history of an old successful vaccination over 12 years ago; *also an occasional unvaccinated case who had been infected in Detroit* (the italics are mine).

(*b*) Severe confluent and semi-confluent cases all in unvaccinated persons.

(*c*) Hæmorrhagic cases all in unvaccinated persons and all fatal.

From this classification the interesting fact emerges that, far from being an instance of a mild type of small-pox suddenly assuming virulence, this was actually an example of the mild Detroit disease preserving its mild type, even in unvaccinated persons in Windsor, in the midst of an outbreak of small-pox of overwhelming severity and high mortality.

South African Evidence.

Let us turn now to the South African evidence. In THE LANCET of Oct. 14th, 1922, Dr. J. A. Mitchell, Secretary for Public Health and Chief Health Officer, Union of South Africa, contributes an important article on Small-pox and Amaas in South Africa. He states emphatically that the mild disease commonly called "amaas" in South Africa "is merely a form of small-pox ordinarily mild and with low mortality, but capable, under largely unknown conditions, of taking on virulent characters and causing the severe disfiguring and highly fatal type of classical small-pox." He further asserts that: "Here, in South Africa, the belief amongst some medical men and a large section of the public that the disease is not small-pox, and that it is of permanently mild type and comparatively unimportant, has repeatedly led to unfortunate results." According to Dr. Mitchell, "every Government health officer in South Africa during the past 25 or 30 years has come to the same conclusion."

This opinion coming from such high authority calls for the most careful examination of the evidence upon which it is based. Dr. Mitchell, in the course of the article quoted, gives four instances where a mild strain of infection, causing disease of the type commonly known as amaas, has become virulent, the later cases being severe and in all respects typical small-pox with a high mortality-rate. These were :—

1. In 1898 Port Elizabeth had 96 cases with 29 deaths (case mortality 30 per cent.) following infection introduced from Graaff-Reinet, where there was an outbreak of the ordinary mild type.

2. Early in 1904 cases of the disease "of remarkably mild type" occurred in the Ixopo district of Natal, the disease subsequently spreading to Estcourt, where, "owing to the mildness of its manifestations, it escaped early detection under the assumed garb of chicken-pox." The infection later became disseminated throughout the greater part of Natal and took on very virulent characters. The final statistics of the epidemic show a total of 1238 cases with 361 deaths—a case-mortality of 29 per cent.

3. An instance of a similar kind has occurred under Dr. Mitchell's own observations and is described by him in these words: "In 1900 I was research bacteriologist to the Robben Island Leper Asylum. There was at the time some sporadic prevalence of mild small-pox or amaas in the southern suburbs of Cape Town and the Malmesbury district adjoining, and people from these areas daily came to the island to visit friends in the asylum. The first two cases were very mild, but a large percentage of the subsequent ones were typical small-pox of disfiguring and dangerous type. Twenty-one cases in all occurred with eight deaths, a case-mortality of 38 per cent. The patients, all coloured female adults, were lepers, but most of them were strong and in good general health."

4. "Again, in 1903, whilst I was at Port Elizabeth dealing with an outbreak of plague, cases of small-pox of the usual mild type occurred amongst natives of the Sunday's River Valley south of Graaff-Reinet. The disease spread down the valley and eventually to the town of Port Elizabeth. The earlier cases were very mild, but later the type became much more severe. The final figures for the outbreak show 222 cases with 17 deaths—a case-mortality of 7·6 per cent."

Criticism of Dr. Mitchell's Evidence.

This South African evidence is entirely unsatisfactory for the reason that in none of these four instances are we furnished with an analysis of the statistics giving the number of cases and the number of deaths *before and after the alleged change in the virulence of the disease.*

The evidence required to satisfy a critical mind on this "change of type of disease" is:—

(*a*) The occurrence of a considerable number of cases of the mild disease of the character described in this article without a death (deaths from other causes excepted). The larger the outbreak of the mild disease without a death, the better is this evidence because it establishes more firmly the mild pedigree.

(*b*) Reasonably convincing evidence that direct infection from this mild source caused small-pox of virulent type with high mortality amongst a sufficient number of patients to exclude constitutional disease or infancy or senility as contributing factors in the fatal result. To make this evidence reasonably convincing, the possibility of another source of infection of virulent small-pox in the vicinity should be excluded.

As already indicated, Dr. Mitchell's evidence does not satisfy these requirements. In each instance all we are told is that the early cases were "of mild type" or "of remarkably mild type."

In order to ascertain precisely what Dr. Mitchell meant by the "*sporadic prevalence of mild small-pox or amaas in the southern suburbs of Cape Town and the Malmesbury district adjoining*," which he suggests was the origin of an outbreak of virulent small-pox with a case-mortality of 38 per cent. amongst the lepers on Robben Island, I asked the medical officer of health, Cape Town, if he would be good enough to furnish me with information about the cases occurring in Cape Town and district in 1900. Dr. T. Shadick Higgins has very kindly sent me a copy of such descriptions of the cases as were actually recorded in the register of cases treated at the Cape Town Small-pox Hospital.

The Robben Island outbreak commenced in October, so that the group of 13 cases recorded in the register for August and September, 1900, would appear to be the cases involved. Of these 13 cases—

2 are described as fatal.
3 ,, ,, ,, severe confluent (one with loss of one eye).
1 is ,, ,, confluent.
1 ,, ,, ,, mild confluent.
1 ,, ,, ,, medium discrete.
4 are ,, ,, mild discrete.
1 is not described.

I venture to submit that, had Dr. Mitchell consulted the records before writing his article, he would not have described these cases as a "sporadic prevalence of mild small-pox or amaas." I further submit that his opinion that mild small-pox or amaas becomes virulent small-pox, is not supported by any evidence which will bear looking into.

Conclusions.

(1) Para-smallpox is a disease sui generis. (2) It is distinguishable clinically from small-pox on the one hand and chicken-pox on the other. (3) It preserves its type as rigidly as does small-pox or chicken-pox or any other of the acute specific infectious diseases. (4) Its mortality amongst healthy subjects is nil, and there is no good evidence to show that the disease ever assumes virulence. (5) Vaccination with the calf lymph used to protect against small-pox is equally protective against para-smallpox. (6) Administrative measures for the control of the disease could with advantage be modified in the light of these conclusions.

BONE IN THE EYE.

BY PERCY DUNN, F.R.C.S. ENG.,

CONSULTING OPHTHALMIC SURGEON, WEST LONDON HOSPITAL; LATE LECTURER ON OPHTHALMOLOGY, WEST LONDON POST-GRADUATE COLLEGE.

SCATTERED within the realm of human disease are problems in pathology of special and speculative interest, and undeniably among these is the formation of bone in an atrophied eyeball.

This change is not a pathological freak, occurring with a rarity suggestive of an exceptional environment, but one which for many years has been known, more or less exclusively, to ophthalmic surgeons as the natural sequence of degenerative processes. The presence of the bone and the source of its development have led many observers to investigate the problem. In regard to the broad outlines of the pathology there is a general agreement, but upon the question of detail much room exists for the expression of divergent views—views which still belong to the sphere of speculation. In this category is included the source of the osteoblasts which remains, among other details, a matter of uncertainty.

Atrophy of Eyeball and Phthisis Bulbi.

Incidentally an atrophied eyeball may be described as an eye which is soft, shrunken, and commonly flattened, following an attack of irido-cyclitis, such as may be caused by penetrating wounds or intra-ocular operations which have proved unsuccessful, by which the nutrition of the eye has been arrested by the inflammatory changes in the ciliary body.

It may be noted here that Fuchs draws a distinction between an atrophied eye and one the condition of which is known, ophthalmologically, as "phthisis bulbi."[1] In his view phthisis bulbi, so called, implies destruction of the whole of the intra-ocular tissues, such as occurs after complete suppuration of the eye. In this case the eye contracts to the size of a hazel-nut or less, whereas an atrophied eyeball retains some semblance to its original formation. Except for cosmetic reasons, in the former case no interference is necessary; on the other hand, in the latter, in the course of time enucleation is expedient.

The Ossification Process.

A period of years is required for the development of the ossification process in an atrophied eyeball—12 years or more. Cases of much earlier dates have been recorded at which ossification has developed. But these are exceptional; nevertheless, the possibility of their occurrence has to be borne in mind.

The mode of detecting the presence of the osseous plates is by means of palpation. Firm backward pressure is needed, and this gives rise to tenderness, which is at once recognised by the patient. At the same time there may not be any sense of hard resistance to the surgeon's fingers, indicating the presence of bone. Again, a patient may make no complaint of an eye in which bone has developed until tenderness is revealed by palpation. The tenderness is probably due to the pressure of what remains of the ciliary body upon the hard bony substance. Palpation of slight degree is not to be relied on; it may elicit no sensation of tenderness, especially as the ossification usually begins at the back of the eye, first developing around the optic disc. The bone also is thickest in this situation, and in the bony plate there is commonly to be seen a round hole, marking the entrance of the optic nerve (vide figure).

Upon reflection it is strange that bone, incidentally of the periosteal type, true bone with definite Haversian systems, should be evolved out of the degenerated inflammatory products of an eye in an atrophied state. This ossification has been defined as "the final stage of degeneration of the organised inflammatory products of plastic choroiditis" (Parsons). Possibly the eye occupying a confined and isolated space provides the conditions necessary for the development of the ossification process. That bone has been said to have been found in structures of the eye other than the choroid, such as the lens and retina, would seem to lend support to this possibility.

Whether the inflammatory changes in an eye, which are ultimately followed by the formation of bone, can give rise to an infective plastic uveitis in the other eye has not been established. No case of the kind has been proved. Modern observation must concede that so-called "sympathetic ophthalmitis" is not a "sympathetic" but an infective disease, and Hill Griffith has recorded that he has never met with bone in eyes removed for "sympathetic ophthalmitis." Furthermore, this disease is not known to follow pus infections of an eyeball. Its infective origin must, therefore, depend upon some organism, still to be discovered, in common with other infective diseases, the micro-organic source of which has so far defied the efforts of the bacteriologist to determine.

Record of Case.

Appended are the notes of a case of bone in the eye which recently came under my observation.

Mr. X., aged 62, came on Oct. 8th, 1924. His previous history was one of many years of articular rheumatism, for which at intervals he had received treatment at Harrogate, Bath, Buxton, and other centres of hydro-therapeutics. Gradually he made a good recovery, and has now for some years been free from his former symptoms. Suddenly, about 15 years ago, the vision in the right eye failed and blindness ensued. I was unable to gather from him the cause of this beyond the fact that he sought advice and followed the treatment recommended. Since then, at various intervals, his left eye has suffered from severe attacks of iritis. In the course of one of these the right eye became inflamed, and the symptoms suggested glaucoma. An iridectomy was performed by an ophthalmic surgeon. Subsequently the eye gradually became atrophic, and at the time of his visit to me it was shrunken, soft, and flattened. Such, I was told, had been its condition for approximately 12 years. No complaint was made of the shrunken globe; palpation at first revealed no response to tenderness, but when firm backward pressure was made a slight sensation of tenderness was admitted.

Examination of the left eye showed atropine irritation of the lower lid. For some considerable time drops of a 1 per cent. atropine solution had been instilled daily in an attempt to dilate the pupil. But the iris was contracted and adherent throughout, the condition present being one of complete posterior synechiæ. The anterior capsule of the lens was fairly clear in the central pupillary space. The tension was good; ophthalmoscopic examination was not possible. The vision admitted was 6/nil; improved to 6/18, nearly, with −7 sph. Apart from the defective vision, the complaint made of the eye was an inability to face a bright light, occasional lacrymation, and a sensation of discomfort. The last attack of iritis occurred four years ago; it persisted for six weeks. Since then the eye has been free from any recurrent reaction.

Actual size.

I enucleated the right eye on Oct. 15th, Dr. S. H. C. Air being present and administering the anæsthetic. The figure illustrates the plate of bone found in the eyeball. One or the other of the openings in the back part of the plate would indicate its position around the entrance of the optic nerve.

That these cases are of clinical importance will be inferred from the above, but added to this is their general pathological interest. Having regard thereto, the fact is somewhat strange that it should have escaped the notice of examiners in pathology. The subject suggests a question in an examination paper. For example: "Under what pathological conditions does bone develop in the eye? Describe the pathology of the process. Of what type is the bone? Discuss the views of the origin of the osteoblasts."

[1] Text-book of Ophthalmology. By E. Fuchs. Eighth English edition. P. 340.

THE DICK TEST FOR SUSCEPTIBILITY TO SCARLET FEVER.

BY CLAUDE B. KER, M.D., F.R.C.P. EDIN.,
MEDICAL SUPERINTENDENT, EDINBURGH CITY HOSPITAL;

J. E. McCARTNEY, M.D., D.Sc. EDIN.,
LECTURER ON BACTERIOLOGY, EDINBURGH UNIVERSITY;

AND

J. McGARRITY, M.D. EDIN., D.P.H. EDIN. & GLASG.,
MEDICAL SUPERINTENDENT, ISOLATION HOSPITAL, CARDIFF.

ALMOST a year ago Drs. George and Gladys Dick[1] described a skin test for susceptibility to scarlet fever on the analogy of the well-known Schick test for diphtheria. The reliability of this important reaction has been verified by, amongst others, A. Zingher [2] and by C. F. Branch and F. G. Edwards.[3] It may be remembered that Dr. and Mrs. Dick [4] succeeded in producing scarlet fever in human volunteers by infecting the nasopharynx with a hæmolytic streptococcus obtained from a case of scarlet fever, and evidence has been accumulating in favour of this micro-organism being the specific cause of the disease. An admirable discussion of the whole question will be found in a paper by Dr. Abraham Zingher,[5] who gives not only an excellent summary of the literature, but also his own results with the test and his experience of the immunisation of 1400 children with scarlet fever toxin. Dr. Zingher believes the test to be "a reliable index of immunity and susceptibility to scarlet fever," and it would appear that in the United States the question of detecting susceptibles and of protecting them by inoculation is being taken up with the same thoroughness which has characterised American work on the Schick reaction and toxin-antitoxin inoculation.

We commenced investigating this interesting reaction about six months ago, and our results have been distinctly encouraging, although, no doubt owing to the use of too weak a toxin, they have not been as consistent as those obtained by Zingher. Nevertheless, they distinctly point to the general reliability of the test, and it is hoped that their publication may stimulate interest in this question in this country.

The toxin, as used by the Dicks, consists of a soluble toxic filtrate obtained from a culture of the specific hæmolytic streptococcus recovered from the throats of scarlet fever patients. A dilution of approximately 1 : 1000, but varying in accordance with the strength of the filtrates employed, is introduced intradermally, as in the Schick test, in a dose of from 0·1 to 0·2 c.cm., the former amount being considered sufficient. At present, unfortunately, it would appear that the only practicable method of standardisation consists in testing a known human reactor with the filtrate under investigation and comparing the results with those of a filtrate already found reliable.

Strains of Streptococci Employed.

In all, filtrates were obtained from seven strains of hæmolytic streptococci isolated from the throats of seven early typical cases of scarlet fever.

Case.	Sex.	Age.	Day of disease.	Case.	Sex.	Age.	Day of disease.
1	M.	14	3rd.	5	M.	5	3rd.
2	F.	12	2nd.	6	M.	9	2nd.
3	F.	21	2nd.	7	F.	3	1st.
4	M.	16	2nd.				

Secretion from the pharynx and tonsils was obtained by means of a throat swab and immediately spread on 5 per cent. rabbit-blood agar plates, which were then placed at once in the incubator. After 24 hours' incubation a large number of colonies of a hæmolytic streptococcus was found in every case, the zone of hæmolysis round each colony being well marked. Typical colonies were transferred to blood-agar slopes and re-plated on blood agar three times to ensure purity. Each strain was tested for its fermentative reactions in Hiss's serum-water medium. All strains gave the same result—namely, acid production in lactose, glucose, and salicin, and no action on mannite, raffinose, and inulin. The stock cultures of these streptococci are subcultured at four days' interval in rabbit-blood broth.

Preparation of the "Toxin."

Flasks containing 100 c.cm. lab.-lemco broth pH 7·5, with 0·5 c.cm. defibrinated rabbit blood, were incubated overnight to test for sterility. They were then inoculated from a 16-hour culture of the streptococcus on blood agar, and incubated for five days at 37·5° C. The growth was profuse and the red blood corpuscles completely hæmolysed. Films were made from each broth culture to ensure that a pure culture of the streptococcus was present. The broth cultures were centrifuged at high speed for 30 minutes, and the clear supernatant fluid then filtered through a tested Berkefeld V filter, using a negative pressure of 200 mm. Hg. The resultant filtrate was carefully tested for sterility on blood-agar plates incubated both aerobically and anaerobically. In no instance did contamination occur. The filtrate was then stored in the ice-box, and when required diluted 1 in 100 with normal saline. This 1 in 100 dilution was sent out in 10 c.cm. rubber-stoppered bottles, each batch of diluted toxin being again examined to ensure its sterility. These toxins are referred to as Nos. 1 to 7, denoting the case of scarlet fever from which the hæmolytic streptococcus was derived. The more recent batches of toxin have been made from 2 per cent. rabbit-blood broth.

It may be mentioned that a hæmolytic streptococcus was obtained at the first attempt from all the seven cases examined. Most of the work was done with filtrates Nos. 3, 4, 5, and 6. Of these No. 3 appeared to be weaker than the others and is chiefly responsible for lowering the general percentage of positive results. Ultimately it was used in lower dilution, 1 : 750 and 1 : 500. The other three filtrates were tested only, and while all gave consistent results, one of them, No. 2, gave a lower percentage of positive results than the other two, and may be considered analogous to No. 3.

The Reaction.

The technique is identical with that of the Schick test, and the diluted toxin must be introduced *into* the skin with the same precision if reliable results are to be obtained. A control with heated toxin should always be employed as pseudo-reactions are liable to occur, particularly as age advances. The toxin is much more resistant to heat than that of diphtheria and requires boiling for one hour before it can be used as a control. A positive reaction resembles very closely that of Schick, an inflammatory area about the size of a shilling appearing at the point of inoculation, varying in intensity from a deep red with some induration to a faint pink with none. An interesting difference, however, is that the Dick reaction appears much earlier and may be recognised at from four to six hours after inoculation. It is probably at its best within 24 hours; indeed, we found that the results given by a 12-hour reading had seldom to be altered on subsequent inspections, and that in some subjects the reaction was less intense at the 24-hour reading. Nearly all our reactions, moreover, had completely disappeared in 48 hours and pigmentation was not observed. Zingher, however, reports that the reactions may be sufficiently pigmented to be visible after six or seven days, and it is quite probable that our filtrates have been too weak. He explains the rapid appearance of the Dick reaction by the fact that the local action of scarlet fever toxin is primarily on the capillary blood-vessels.

Pseudo-reactions have not been very common, a fact readily explained when it is considered that the tests were made chiefly in children. Owing to the usual lack of pigmentation of the true reaction it is practically impossible to distinguish them unless control tests are used.

Results.

We have tested at the Edinburgh City Hospital 883 individuals in all, 441 of whom were scarlet fever

patients at different stages of the disease, and 442 were either patients with other diseases, chiefly diphtheria, measles, and whooping-cough, or members of the staff and their children. Our first observation was certainly impressive. It was thought advisable to make the first trial of the reaction on the medical staff, numbering six. Of these three had had scarlet fever and all were negative. The other three had not had the fever and two were positive. The third was negative, but it was already known that his blood serum gave a positive Schulz-Charlton reaction, blanching a scarlet fever rash, and that he was therefore almost certainly immune.

Table I. shows the percentage of positive results obtained at different ages in the 442 individuals not suffering from scarlet fever. In the last column we have taken the liberty of showing Dr. Zingher's percentages, obtained from a very much larger number

TABLE I.—*Showing Percentage of Positive Dick Tests in 442 Individuals not Suffering from Scarlet Fever.*

Age-period in years.	Total.	Negative.	Positive.	Positive percentage.	Dr. Zingher's positive percentage.
0–½	4	4	0	0	44·8
½–1	14	13	1	7·1	64·2
1–2	35	21	14	40·0	70·7
2–3	28	9	19	67·8	67·8
3–4	45	20	25	55·5	59·4
4–5	45	15	30	66·6	46·4
5–10	129	53	76	58·8	35·4
10–15	57	27	30	52·6	25·4
15–20	26	16	10	38·4	26·3
20–30	39	20	19	48·7	17·9
30–40	12	10	2	16·6	
40–50	4	2	2	50·0	
50–	4	4	0	0	
Totals ..	442	214	228	51·5	—

(4570) of cases. Our own numbers, of course, are too small to give reliable results. The figures suggest, however, that, as in the case of diphtheria, immunity to scarlet fever is not acquired as early in Edinburgh as it is in New York. Our percentages, moreover, seem to show that susceptibility to scarlet fever is highest just at those ages at which the fever is found most frequently to occur. Of the persons included in Table I., 45 gave a definite history of a previous attack of scarlet fever. Of these only eight gave positive reactions, the remainder, 80 per cent., being found to be negative. When it is considered that histories are not always accurate, this result may be regarded as reasonably satisfactory.

Table II. refers to the 441 scarlet fever patients examined and shows the percentage of positive and negative reactions at different stages of the disease. It will be noticed that 73 per cent. of the patients tested in the first three days of their fever gave

TABLE II.—*Showing Results of Tests in 441 Scarlet Fever Patients in Different Stages of their Illness.*

Stage of disease.	No. tested.	Positives.	Positive percentage.	Negatives.	Negative percentage.
In first 3 days ..	23	17	73·9	6	26·0
From 3rd–6th day	103	60	58·2	43	41·6
,, 6th to 14th ,,	78	19	24·3	59	75·6
Third week	68	16	23·5	52	76·4
Fourth ,, ...	44	4	9·0	40	90·9
Fifth ,, ...	60	10	16·6	50	83·3
Sixth ,, ...	24	1	4·1	23	95·8
Over six weeks ..	41	3	7·3	38	92·6

positive reactions. This we admit to be a very unsatisfactory result as Dr. Zingher reports 100 per cent. positive at this early stage, and on the analogy of the Schick test his experience is what would naturally be expected. Our comparative failure points to a probable weakness of our toxin, and it is obvious that faint or doubtful Dick reactions have very little chance of being detected against the background of a brilliant scarlet fever rash. It is not improbable that many slight reactions were missed.

On the other hand, allowing for slight irregularities in the table due, no doubt, to the small number of cases, the decline in susceptibility in successive weeks is demonstrated satisfactorily enough by our figures, and certainly suggests the general accuracy of the test. One hundred patients who had been found positive before the eleventh day of illness were re-tested. Sixty-four re-tests were made before the sixteenth day and 81·2 per cent. were negative. Thirty-six re-tests made between the thirtieth and fortieth days of illness gave a negative percentage of 75, the difference suggesting that a higher proportion of these late tests were made with a weak filtrate. Combining these groups it was found that 79 per cent. of 100 patients, originally positive, became negative by the fortieth day.

Two other experiments were made. Eleven individuals, all positive, were re-tested with a toxin, diluted not with saline solution, but with convalescent scarlet fever serum, which was known to produce a Schulz-Charlton blanching reaction on scarlet fever rashes. All were found to give completely negative results. Five positive susceptibles were protected with subcutaneous doses of from 3 to 5 c.cm. of convalescent serum and 48 hours later tested with an active filtrate. It was expected that the reaction would be prevented. Unfortunately this experiment failed completely, and all five patients gave good positive reactions. The failure in this case might be held to depend either on the weakness of the convalescent serum, although it gave a positive Schulz-Charlton test, or on an insufficiency in the amount of the dose injected.

Conclusions.

There appears to be no difficulty in obtaining from the throats of early cases of scarlet fever hæmolytic streptococci from which may be prepared filtrates which, when suitably diluted, may be safely injected intradermally and which cause a local reaction in persons who are presumably susceptible to scarlet fever or who are actually suffering from its early manifestations. This reaction is not liable to occur in the vast majority of persons who have already had scarlet fever, and in scarlet fever patients tends to become negative as convalescence advances. As regards those individuals who, not having had scarlet fever, nevertheless give negative reactions, it may be assumed that they have, as in the case of diphtheria, acquired immunity by exposure to subinfective doses of virus at some previous period of their existence. The chief difficulty at present is to standardise the toxin. If it is too weak the results will be unreliable the proportion of positive reactions being unduly low, as we are convinced is the case in this series of observations. One of us had, in the early days of the Schick reaction, equally unsatisfactory results, the commercial toxins then supplied giving perhaps 10 per cent. or 15 per cent. of positive results at age-periods at which nowadays 70 per cent. or 80 per cent. may confidently be expected. This difficulty can to some extent be overcome by carefully comparing the results of different filtrates on known human reactors. It is probably wise, when a satisfactorily acting filtrate is obtained, to use it exclusively, and we have no doubt our findings would have been much more consistent if we had done this from the first. Our work is still being carried on, and with the experience already gained we hope to obtain better and more convincing results.

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A STUDY IN INFANT FEEDING.

FOOD REQUIREMENTS OF INFANTS.

BY DONALD PATERSON, M.B. EDIN., M.R.C.P. LOND.,
PHYSICIAN FOR DISEASES OF CHILDREN, WESTMINSTER HOSPITAL, HOSPITAL FOR SICK CHILDREN, AND THE INFANTS HOSPITAL, WESTMINSTER;

AND

RUTH DARBY, M.B., CH.B. BIRM.,
SENIOR HOUSE PHYSICIAN, THE INFANTS HOSPITAL.

IN this study an attempt has been made to reduce to some sort of order the clinical experience of ourselves and others in regard to infant feeding and to formulate some rules which may act as a "stepping off" place for those about to undertake the direction of feeding infants.

From the first it must be understood clearly that the healthy normal infant and the under-weight infant present different problems, and therefore separate rules have been laid down for each group. We consider that the first essential for anyone practising infant feeding is to *think in terms of the amount of food required in 24 hours rather than in the individual feeds.* A rough guide obtained by the study of 50 normal or overweight thriving infants is given below. It will be noted that the amounts mentioned are the amounts of the different foods per pound of body-weight per day. Although not strictly accurate in all cases, it is much nearer the truth than feeding infants by their age. The fatter and more above average weight the infant is, the less food he requires per pound of body-weight per day. Some infants are active, cry a lot, and require more food to make them thrive. These are more often than not male infants. Other infants sleep well, are inactive, and thrive on very little food, and most often these are girls. In warm weather all infants require less food than in a cold, stimulating atmosphere.

The individual infant, then, must be studied, and there is no rule, nor can there ever be any rule, applicable to all infants. It cannot be emphasised too strongly that the infant itself is the final judge in this most important point in infant feeding.

Guide for Normal Infants.

We believe that the following is near the truth in most cases of infant feeding and worth recording:—

Breast Milk.—The average full term breast-fed infant gets from 2½–2¾ oz. of breast milk per pound of its body-weight in the day. That is, the average infant weighing 10 lb. requires from 22–25 oz. of breast milk in 24 hours. If fed five times in 24 hours each feed would consist of 5 oz. of breast milk.

Whole Cow's Milk (*Boiled or Unboiled*).—Since to cow's milk both sugar and cream (as dairy cream or emulsion of cod-liver oil) have to be added, the amount of cow's milk is found to be 1¾ oz. per pound of body-weight in the day. Enough water must be added to bring the total of the feed out to 2½ oz. per pound of body-weight in the day. Sugar should be added in the quantity of one level teaspoon (¼ dr.) per pound body-weight per day. A teaspoonful of cream or emulsion of cod-liver oil should be given three times in the day.

Dried Milk (*Full Cream*) (*Glaxo, Cow and Gate, Ambrosia, &c.*).—Two heaped teaspoons (2 dr.) per pound body-weight per day with sugar added—one level teaspoon (¼ dr.) per pound body-weight per day. This should be dissolved in 2½ oz. of water per pound body-weight per day. That is, a 10 lb. baby fed four-hourly (five feeds) would be given 20 dr. of dried milk and 5 dr. of sugar dissolved in 25 oz. of water in the day. That would be five feeds of 5 oz. of the mixture.

Dried Milk (*Humanised*) (*Prescription Glaxo, Humanised Trufood, and Allenburys No.* 1).—2½ dr. dissolved in 2½ oz. of water per pound body-weight per day.

Guide for Wasted Infants.

In dealing with *under-weight* infants the problem of infant feeding presents many difficulties. Having excluded those cases of organic disease and gross congenital malformation, and decided that the case is one of the so-called idiopathic type, an examination of the hygiene and management of the child will, as a rule, reveal the source of error. Just as when dealing with premature infants the intake of food must be increased greatly per pound body-weight per day, so the same rule applies in dealing with the under-weight full term infant. The same difficulty, which is fundamental, also arises—namely, the ability of the under-nourished infant to digest a sufficiently large quantity of food to make it thrive without upsetting its digestive system.

It is stated by some authorities that when calculating the feed of an under-weight infant it should be calculated on the weight it should be for its age (the expected weight) rather than the weight which the infant actually is. We have never found this to be the case. The actual amount required lies somewhere between the amount calculated on the actual weight and the expected weight. To simplify matters, we have analysed 50 cases of malnutrition in infants who were doing well although grossly under weight. The following are our findings:—

Sweetened Condensed Milk (*Nestlé's*).—3–4 dr. (teaspoons) per pound body-weight in the day with a teaspoonful of emulsion of cod-liver oil three times daily.

Dried Full Cream Milk (*Glaxo, Cow and Gate, Ambrosia, &c.*).—2½ dr. (heaped teaspoons) per pound body-weight per day with sugar ¼ dr. per pound body-weight per day, and emulsion of cod-liver oil as before.

Dried Humanised Milk (*Prescription Glaxo, Humanised Trufood, Allenburys No.* 1).—3 dr. (heaped teaspoons) per pound body-weight per day.

Cow's Milk (*Unboiled, Boiled, or Peptonised*).—2 oz. per pound body-weight per day with emulsion of cod-liver oil, sugar, and water added as before.

Conclusions.

The following are the amounts per pound body-weight per day of various foods which should be given to—

(*a*) *Thriving Infants.*—Breast milk, 2½–2¾ oz.; whole cow's milk, 1¾ oz. with sugar ¼ dr.; dried full cream milk, 2 dr., with sugar ¼ dr.; humanised dried milk, 2½ dr.

(*b*) *Wasted Infants.*—Sweetened condensed milk, 3–4 dr. plus emulsio ol. morrh.; dried full cream milk, 2½ dr., with sugar ¼ dr.; dried humanised milk, 3 dr.; cow's milk, 2 oz., with sugar ¼ dr.

To each infant a teaspoonful of cream or cod-liver oil emulsion should be given three times daily before its feed, and the total of the feed, whether cow's milk, dried milk, or condensed milk with water added, should not exceed 2½ oz. of fluid per pound body-weight per day.

A NEW nursing home for patients of limited means has been recently opened in the suburbs of Liverpool in connexion with the Liverpool Stanley Hospital. As the result of a large legacy by the late Mr. Robert Davies a mansion house with extensive grounds has been acquired some three miles from the centre of the city in open country, and has been converted into an up-to-date private hospital with 30 beds. There is an admirable operating theatre, and it is hoped shortly to provide an X ray department. The rooms are attractively panelled and of lofty proportions, and are arranged on two floors connected by an electric lift. Although in close association with the Stanley Hospital, the home is intended to be open to all persons of limited means. It is proposed to charge 3 guineas a week for beds, curtained off in rooms of two, three, or four each, and 4 guineas for single-bedded rooms. Professional fees will be reduced proportionately.

Medical Societies.

MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES.

A MEETING of this Society took place on Jan. 23rd, when Colonel L. W. HARRISON, the President, delivered an address on the

Value of the Scientific Outlook to the Worker in Venereal Diseases.

The President said that in the course of his work, which brought him into contact with many specialists in venereal diseases, he had formed the opinion—which he would be glad to have grounds for changing—that many clinicians worked too much on empirical lines. They were content to follow along paths recommended by some enterprising author without any clear idea of the principles which should govern their line of action. Often also he found clinicians and pathologists working in compartments, entertaining some little mutual suspicion of one another, when the fact was that coöperation between these two classes of workers was essential to progress. Much of the criticism which had been levelled at the reliability of serum tests of syphilis sprang from a lack of knowledge on the part of many clinicians of the scientific principles and technique of the tests, and consequent inability to understand the point of view of the pathologist. He had heard clinicians criticise particular results as contrary to the clinical findings when it was clear to anyone with a knowledge of the tests in question that the pathologist most probably never intended the interpretation of his report which had been made of it by the complaining clinician. Sometimes, for example, a pathologist spoke of a "weakly positive" reaction, and the clinician, suspecting that the patient was suffering from syphilis, seized upon the word "positive" and used it as his justification for making the diagnosis of syphilis. A little knowledge of the technique and a little conversation with the pathologist would have prevented his acceptance of a "weakly positive" report as justifying anything more than a suspicion, and would have made it clear to him that between the plainly syphilitic reaction and the clearly negative there was a zone into which some non-syphilitic serum now and then wandered.

It would be a great gain, Colonel Harrison continued, if clinicians would study more closely the pathological processes and have more sympathy with laboratory work. Workers in venereal diseases, perhaps more than in any other branch of medicine, had occasion to be grateful to laboratory research. He need only mention a few examples. The arsenobenzol compounds were largely the product of pure research. The bismuth treatment owed its existence to a surmise by a chemist that from its chemical structure bismuth should be anti-spirochætal. To the laboratory were due the serum tests of syphilis and the discovery of the micro-organisms of that disease and of gonorrhœa. Histologists had shown the pathological processes at work in both these diseases, and from them much had been learned of the real problem in treatment as well as something of the lines on which to solve the problem. The histologist also had shown intimately the toxic effects of the anti-syphilitic treatment, and the biochemist had indicated some of the ways in which the toxic effects might be avoided. These were only a few of the debts which the clinician owed to the laboratory worker. Colonel Harrison also spoke of the value of a laboratory training to the clinician. Habits of thought which were developed in laboratory research assisted him greatly in solving his clinical problems. The laboratory worker had the advantage over the clinician that his observations could be more exact, he obtained his results much more quickly, and wrong processes of thought were sooner corrected. Many pitfalls would be avoided if such methods of thought were adopted more extensively by clinicians. He illustrated his remarks by a reference to criticisms of the vaccine treatment of gonorrhœa. Many of these criticisms were based merely on desultory observations, without any exact computations of results as to complications, period of infectivity, or the possibility of the vaccine employed in a particular case being an anti-immuniser. There was too much generalisation from the mere impression that in a given set of cases the non-vaccinated did as well as the vaccinated.

The pathologist, Colonel Harrison concluded, as well as the clinician, had much to gain from closer coöperation. The pathologist made up his vaccines from such strains as came to him, but everyone knew that strains of micro-organisms varied in their immunising power. The pathologist had no means of knowing whether he was putting a majority of good immunisers or the reverse into his vaccine, and there was little wonder that the clinician gained a bad impression. The clinician might help a little, at any rate, by his observation of the immunising powers of different strains on the patients who provided them. Two workers by coöperation could at least work out the problem in a way which would be impossible to either of them singly.

Vaccine-therapy of Gonococcal Infections.

Dr. P. N. PANTON then opened a discussion on the Vaccine-therapy of Gonococcal Infections. His remarks were limited to a description of some original experimental work not yet completed which it was desired should not be published at the moment.

Dr. ARNOLD RENSHAW said that in the treatment of gonococcal infections by vaccine-therapy there were four things to be considered: (1) Specific vaccine-therapy for the gonococcus; (2) specific vaccine-therapy for associated organisms; (3) non-specific vaccine-therapy; (4) general conclusions. The significant facts with regard to gonorrhœa were its great tendency to relapse, its tendency to become chronic, and, when cured, the ease of reinfection. This indicated poor immunity response, and supporting views were the variable ocular resistance to infection, one eye often showing more reaction than the other, and also the length of time the organisms could remain alive in the prostate, as evidenced by Cobbledick's investigations. A further difficulty with regard to vaccine treatment when using stock vaccines was the number of strains of gonococci which existed. Torrey, in 1907, claimed at least seven different strains, and after further work, which was still proceeding, this investigator believed that it was not possible to demonstrate definite groups such as occurred amongst pneumococci and even meningococci. A study of 50 strains had shown that certain general strains existed possessing antigenic properties common to a considerable part of the "whole" species. There were, however, amongst recently isolated organisms a large number of variants which showed no specific agglutination towards each other, but which quite often showed some specific relationship to one or more of the specific strains. These variants overlapped in such a way that it was not possible to divide them into special groups. After many references to literature, the speaker's general conclusion was that too much attention had been focused upon opsonins, &c.—namely, on the molecules surrounding the gonococcus—and not enough on those molecules which would "bang their way through the bacterial envelope." In other words, chemo-therapeutics must be developed. Too much attention had been paid to a study of gonorrhœa, and too little to a study of the gonococcus. The chemistry of this organism must receive adequate attention. Vaccine-therapy of gonococcal infections must ultimately give way to something better, more vigorous, more decisive in action, and the diagnosis of gonococcal complications must be neater, more precise, and more generally applicable. Until that time came it behoved bacteriologists not to blind themselves to the deficiencies of the methods now available, but to look ahead to more

precise methods and to more adequate means, and to assist the clinician by studying other means of dealing with this organism. The sooner one admitted this position, and the earlier one became completely and entirely dissatisfied with the state of affairs, the sooner would efforts be launched along newer lines of attack.

Discussion.

Mr. T. P. BEDDOES agreed with the President that what was needed was greater harmony between the clinician and the pathologist. The individuality of the Englishman was rather a barrier. As shown by the papers read that evening, clinical work on this subject was capable of very great advance.

Major A. T. FROST said that, with regard to a remark by the President in his address earlier in the evening, he really thought the pathologist would have to take the bull by the horns and give the clinician an idea of what he had got to do to confirm a diagnosis if it was not strongly positive or negative. With regard to the particular point at issue—namely, the gonococcus—there he thought the pathologist was to blame, for he made a vaccine, labelled "gonococcal vaccine," and left the clinician to find his own way with regard to dosage. This Society, he thought, might be very well occupied in trying to standardise dosage. The gonococcus appeared to him to be a very fickle and dangerous organism. A good many stock vaccines prepared in large quantities were probably not of much value, and yet those vaccines were used for the purpose of drawing conclusions. The question of local immunity also should be followed up.

Major W. DE M. PEYTON believed that the vaccines had hitherto been given at too short intervals, and said his experience was that the interval between each dose ought to be lengthened out. A very excellent adjunct to vaccine-therapy, he thought, was the protein shock method which had recently been discussed, and he described his experience of this method, which he believed to be superior to the too frequent repetition of the vaccine. It had been his experience during the past few years that vaccines given at very frequent intervals were rather liable to destroy immunity, and perhaps workers had been rather encouraging the gonococcus to digest its own antibodies.

The PRESIDENT said that many new points had been raised that evening, but the discussion had made at least one thing clear—namely, that team work was essential, and that, as he had suggested in his address, the pathologist must collaborate with the clinician, and vice versa.

Dr. PANTON, in replying on the discussion, referred to the point raised by Dr. Peyton as to the frequency of dosage. He had often felt, in his own limited experience of giving vaccines, that one was in danger of breaking down immunity rather than of increasing immunity if vaccines were given over too long a space of time.

Dr. RENSHAW agreed that vaccines could be given too often. It was rather a question of over-sensitisation, so that one got a too vigorous tissue response to a very weak dose.

LISTERIAN SOCIETY.

AT a meeting of this Society, held at King's College Hospital on Jan. 21st, Mr. C. P. G. WAKELEY being in the chair, Sir BERKELEY MOYNIHAN delivered a lecture on

Some Aspects of Cholelithiasis.

He began by giving a few statistical figures and then went on to explain the possible modes of infection of the gall-bladder, and illustrated this part of the lecture by a series of very beautiful lantern slides of microscopic sections of the entire thickness of the wall of the gall-bladder. These slides showed round-celled infiltration beginning either in the submucosal or subperitoneal coats of the gall-bladder according as to whether the infection was conveyed either by the bile-ducts or by the blood-stream. Typhoid fever was always blood-borne, never bile-borne. The lecturer then laid emphasis on the fact that gall-stones were evidence of preceding gall-bladder disease, with the one exception of the single cholesterol stone, which gave rise to but did not follow inflammation of this viscus. He was at present engaged in research work on the cholesterol content of the blood, finding that in all cases of gall-stones there was a hypercholesterolæmia, and he showed charts comparing this with a similar condition found in infections of the urinary tract, during pregnancy, and in the premenstrual cycle. It was possible in every case of multiple stones to arrange the stones into three and sometimes four groups, and he considered that this fact indicated that the gall-bladder had been subjected to waves of infection. The lecturer cut out what he regarded as a pathological gall-bladder; one where its walls were thicker and less resilient than normal; where the typical blue colour was wanting: where the peritoneal covering had lost its normal sheen; and, most important of all, where there was a deposit of fat under the peritoneal coat of the gall-bladder. Such a viscus should invariably be removed whether it contained stones or not.

Sir Berkeley Moynihan went on to describe some of the difficulties in diagnosis by X rays, pointing out the fallacies which might arise in all but those cases where the gall-bladder gave a denser shadow than the gall-stones. It was important in all cases to employ the barium meal radiography, for by this means it was possible to show pressure displacement of the stomach, duodenum, and colon by a large distended gall-bladder or traction displacement by a shrunken adherent gall-bladder.

Finally, the lecturer urged his audience to cease regarding gall-bladder surgery as anything but the most difficult branch of abdominal surgery. It was not sufficient to be a good abdominal operator; long and uninterrupted experience of this particular branch was the all-important essential.

MANCHESTER MEDICAL SOCIETY.

A MEETING of this Society was held recently, Prof. G. R. MURRAY, the President, being in the chair.

Dr. G. J. LANGLEY read a paper on the

Use and Abuse of Digitalis.

He pointed out that abuse might be heaped upon the drug for two reasons: (1) its use under erring conditions, or (2) the use of an ineffectual preparation. The reputation of the digitalis group appeared to rest upon its power to increase the force and effectiveness of the cardiac stroke, but unequivocal evidence in the field of experimental pharmacology was difficult to find. The great complexity of cardiac problems made the interpretation of experimental results very difficult. Four or five factors determining the force of a cardiac stroke at once arose to the mind—e.g., slowing, increased intake, raised peripheral pressure, myocardial nutrition, carbon dioxide exchange. When the results obtained in undoubted cases of auricular fibrillation were considered, the whole aspect of the matter changed, and it was in this group that brilliant results were almost always obtained. Yet here again for complete success two factors were essential: (*a*) auricular fibrillation and (*b*) adequate dosage. The dosage of the drug necessary to produce effect, the various methods of physiological assay, and the toxic effects were discussed by Dr. Langley. Reasons were given for the belief that the optimum therapeutic dose and the toxic dose lay very near together, that the most important effect of the drug was the delay caused in bundle conduction, but that some effect was produced on the ventricular muscle,

as indicated by the inversion of the electrocardiographic T-wave. Eggleston's massive digitalis method was next discussed. A strong reason for the wider adoption of this method was that by its adoption it was possible to save the patient much time and discomfort. The method was reserved for fibrillation at high speed with relative or absolute cardiac failure, and the dose was calculated in terms of cat units. Particulars of 16 recently tested cases were given. The response in all cases except one was most successful and the rapidity of action saved much suffering. Eight hours after the dose the patient was relatively comfortable, and the pulse-rate in nearly every case was 80 per minute or less. In one case the drug appeared to have a definitely toxic effect upon the heart, the pulse speed being raised and the form of the electrocardiogram entirely changed. It was finally submitted that digitalis was specific for the control though not for the cure of auricular fibrillation, that it was likely to be useless and possibly dangerous in other diseases, that the therapeutic and the toxic dose lay very close together, and that massive digitalis dosage was both reasonable and desirable in suitable cases.

WEST KENT MEDICO-CHIRURGICAL SOCIETY.

A CLINICAL meeting of the Society was held at the Miller General Hospital, Greenwich, recently, Dr. H. S. KNIGHT, the President, being in the chair.

Exhibition of Cases and Specimens.

Mr. C. A. JOLL showed: (1) A woman, aged 52, who suffered from dyspepsia. She was unable to take solids, and had pain after food. At operation there was no trace of ulcer. For the visceroptosis the ascending colon was fixed and the appendix removed. The futility of colopexy was shown by her return recently when at operation an ulcer of the posterior wall of the stomach was excised. (2) A man, aged 34, who suffered from indigestion for seven years. He had flatulence and pain three to four hours after food. Vomiting relieved pain. The stomach was atonic. An ulcer was found on the posterior wall of the lesser curvature and there was much hypertrophy of the pylorus. Half the stomach was removed as Mr. Joll was of the opinion that the ulcer would not heal with posterior gastro-enterostomy. (3) Specimen showing a perforated gastric ulcer from a girl, aged 12 years, who died soon after admission. (4) A patient who had an operation two years ago for appendicitis. As he had a swelling he was operated on and a gangrenous and perforated appendix was removed; he developed a fæcal fistula, now healed.

Mr. H. DAVIES showed: (1) A man, aged 78, from whom he removed a tumour, the size of a fœtal head, from the biceps cruris. The tumour was painful, adherent to the skin but not to the bone, and proved to be a spindle-celled sarcoma. (2) A man with a Charcot knee-joint of sudden onset. There were loss of knee-jerks and Argyll Robertson pupils. He was treated by a walking calliper.

Dr. M. DAVIDSON showed: (1) A young man, a stoker, with wasting of the muscles supplied by the median and ulnar nerves of the left hand. He was otherwise healthy. There was no cervical rib nor evidence of progressive muscular atrophy. (2) A boy suffering from bronchiectasis and paresis of the orbicularis oris muscle and wasting of shoulder girdle muscles. (3) A woman with fibrosis of both lungs, who developed enlargements of the ends of the bones, fingers, wrists, and ankles.

Dr. H. PRITCHARD exhibited specimens from a case of infective endocarditis showing vegetations and infarcts in the spleen. The man had no fever and only complained of fainting attacks. Mitral regurgitation was present.

Reviews and Notices of Books.

ST. ANDREWS INSTITUTE.

Reports of the St. Andrews Institute for Clinical Research. Vol. II. London: Humphrey Milford, Oxford University Press. 1924. Pp. 190. 10*s.* 6*d.*

EVEN the busiest practitioner should spare the time necessary to study reports issued by this Institute. In the first place the workers there have his interest particularly at heart and are concerned to produce work whose clinical application shall follow as closely as possible behind its academic interest, and in the second place they have the habit of putting forward their results in an attractive way. The second volume maintains the high standard of the first; it contains ten papers of great interest on physiologico-clinical matters, centring mainly around the problems of the reflex arc and cellular action.

The late Sir James Mackenzie, until recently Hon. Director, was responsible for the first two papers, the substance of which has been published. In the first of these the various forms of irregular pulse are considered, sphygmographic and venous tracings being shown parallel with diagrams which display the processes at work in the heart substance. In the second there is a further elaboration of the principle enunciated in the first volume of "Reports"—viz., that the great majority of the symptoms of disease are of the nature of a disturbance of a reflex process. In the succeeding paper Dr. A. Walker briefly cites two cases of tremor and fibrillation in muscle supporting the view that nerves of supply exert control on the muscles innervated.

Most practitioners have learned by now that the old academic signs of heart failure are not the best clinical tests of the efficiency of myocardium. Dr. James Orr, in a previously unpublished paper entitled "Cardiac Pain in its Relation to the Response to Muscular Effort," discourses further on this subject. The criterion of inefficiency is the prematurity of onset of symptoms of over-taxation, applied to the daily round and common task, not to any standard test or special exercises. Dr. Orr quotes, with excellent illustrations, 13 cases showing that an impaired heart which is able to maintain an adequate blood-supply to the body manifests its condition by pain, while breathlessness supervenes when the output is inadequate. Prof. P. T. Herring writes on the Regulating and Reflex Processes, and reviews the present opinions of the Institute with regard to the general principles underlying reflex action and their application to abnormal functioning. He also reprints his paper on the Law of Fluctuation, previously published in *Brain*, in which it is suggested that the multiplication of receptors and branches of the neurone at the periphery and of dendrites at the synapse is due to the need to supply relays of the readily fatigable units to serve the indefatigable nerve fibre. He also illustrates the conception of relays of fibres, working alternately under the "all or nothing" law, in continuously acting muscles, such as the diaphragm and heart.

Next Prof. David Waterston records an investigation into the sensory activities of the skin for touch and temperature, as a result of which he concludes that deformation of the skin is the effective stimulus for touch sensation, the epithelial cells themselves acting as the receptors. The baffling variations in temperature-spots noted by other observers are explained by the law of fluctuation, only a few spots being active at any one time, as, being readily fatigued, they are soon replaced by others not previously active. Drs. J. H. P. Paton and A. Rowand publish a report on 15 radiograms of normal infants' chests in which they found considerable shadowing around and radiating from the roof of the lung, probably due to blood-vessels, and much variation in the shape of the heart shadow. This is another reminder of the necessity for knowing more about

the normal before we begin to dogmatise on the pathological in X ray work. Dr. Paton also contributes a clinical study of a mild influenza epidemic in the same school as that which formed the subject of his paper in the first volume of reports. He concludes that the incubation period is normally 48 hours and the period of infectivity at least six days, that acquired immunity is of short duration, and that prophylactic vaccination does not seem likely to be of value.

The concluding paper in the volume is a reprint of the observations of Prof. Herring and Dr. F. G. Macnaughton on the lymphatic system, with special reference to tuberculosis. In the introduction the references to previous appearance of certain of the contributions in medical journals have not been checked.

DYSPEPSIA: ITS RELATION AND TREATMENT.

Second edition, revised. By W. SOLTAU FENWICK, M.D., B.S. Lond., late Physician to the Evelina Hospital for Sick Children. London: W. B. Saunders Company, Ltd. 1924. Pp. 515. 24*s*.

THIS book cannot be called representative of the views held by modern observers of the phenomena of dyspepsia; indeed, the author ignores recent research completely, his general views diverging from those which to-day are accepted either as authoritative or as replacing former ones. But there is, we hasten to say, no pretence whatever in the volume to cover grounds unsurveyed by the author. Of the mass of references given in the bibliography but a small proportion has reference to work published during the present century, and as far as we have been able to see there are only four allusions to work which was done during the last 15 years, while of these three concern contributions from the author himself. There is no reference we think to the work of A. J. Carlson, B. B. Crohn, M. E. Rehfuss, J. C. Roux, A. Alvarez, C. Moutier, P. Le Noir, A. F. Hurst, C. Bolton, T. I. Bennett, or D. Hunter, and only a few of the many distinguished surgeons whose activity all over the world has thrown a flood of light on the problems of dyspepsia are mentioned. The author does not attempt to give the impression that he has sorted and evaluated this mass of modern work, and some doubt must arise as to the meaning of the statement that this, the second edition of the treatise, is revised. The first edition was published 14 or 15 years ago, and our review of it indicated that it contained helpful advice both in classification and therapeutics, and how could it be otherwise considering the author's experience? But a re-issue taking little or no account of the progress that has taken place in the interval following a first imprint requires more justification than can be found in the survival of popularity. We doubt if Dr. Fenwick has been wise to sanction the second edition without bringing the work more up to date either personally or through collaboration.

CHEMICAL DYNAMICS OF LIFE PHÆNOMENA.

By Prof. OTTO MEYERHOF, Kiel. London: J. B. Lippincott Company. 1924. Pp. 110. 12*s*. 6*d*.

THIS little book consists of five separate lectures by Prof. Meyerhof, published together as one of the monographs on experimental biology issued under the general editorship of Jacques Loeb, T. H. Morgan, and W. J. V. Osterhout. The first lecture, entitled "On the Physico-chemical Mechanism of Cell Respiration," was delivered in Cambridge in the summer of 1922 and was printed in its original form in THE LANCET (1923, i., 322). The remaining lectures were delivered at several places in America, including the Rockefeller Institute of New York. In the second lecture, entitled "Autoxidations in the Cell," the author expresses the opinion that "the more closely we study the machinery of life in the isolated cell, the clearer it becomes that the chemical and physio-chemical processes predominate in it." In support of this he reviews the evidence for the continued respiration phenomena in unfertilised sea-urchins' eggs after destruction by grinding with sand, and in other autoxidisable systems such as glutathione, and comes to the conclusion that the unsaturated linolenic acid "represents the most essential oxygen acceptor of muscle in presence of SH." The lecture ends with the statement that "only the collection of a large number of data will complete the task of tracing the oxidation mechanism in the cell back to the events of inanimate nature." The second lecture, entitled "Chemical Relations between Respiration and Fermentation," is concerned with the demonstration of the fact that the dialysable thermostable "respiratory substance" contained in boiled extract of muscle can replace the co-enzyme of yeast in restarting the fermentation of yeast, from which the co-enzyme has been removed, and consequently that the same body can serve both for respiration and for fermentation. A further link between the two processes of carbohydrate metabolism is furnished by the demonstration of the occurrence of hexose phosphate esters in both cases and the remarkable fact that arsenates which accelerate fermentation by stimulating the cleavage of hexose phosphate, also increase the respiration of muscle, presumably by the same process of stimulating the hydrolysing enzyme hexose phosphatase. From these facts it is concluded that the co-enzyme common to respiration and fermentation may be concerned in the esterification of organic compounds with phosphoric acid, whereby such compounds become more unstable or susceptible to attack; the suggestion is indeed put forward that such esterification is a preliminary to the respiratory oxidation of fats as well as of carbohydrates. The lecture concludes with the significant remark that "it may indeed be considered a success of general physiology, and its mode of experimenting, that the chemical dynamics of a highly differentiated organ like the muscle could be partly revealed by the study of alcoholic fermentation of yeast."

The two remaining lectures on the "Transformation of Energy in Muscle" and the "Energetics of Cell Processes" form rather difficult reading and will only be appreciated by those who have some acquaintance with thermodynamical reasoning. The author expresses his indebtedness to others for the revision of the English text. This revision would appear to have been somewhat perfunctory; the style frequently betrays evidence of a too literal translation, which does not necessarily convey the exact meaning of the original.

BOOKS FOR NURSES.

Elementary Anatomy and Physiology for Nurses. Third edition. By H. CLIFFORD BARCLAY, M.D., F.R.C.S. Edin.; late Major R.A.M.C.; Examiner in Forensic Medicine, New Zealand University. London: Baillière, Tindall and Cox. 1924. Pp. 411. 12*s*.

THIS book is a remarkable one, its title giving no hint of its scope or worth. It is intended as an introduction for nurses to the scientific foundations of their work, and to the principles underlying the work of physicians and surgeons. The author premises that some knowledge of anatomy and physiology are essential for an intelligent comprehension of a nurse's duties, but he goes further and treats of these subjects as branches of the wider subject of biology. In his hands the result is a logical and orderly review of life, its origin, its conditions, and its meaning, commencing with the vague movements of an amœba in search of food and ending with what are, perhaps, the equally vague efforts of the human psyche after happiness. The first half of the book is devoted to a

brief but clear sketch of human anatomy, but it is in the second half that the author really finds himself. A sketch of evolution and of the nature of protoplasm leads up to a series of short chapters on the physiology of the various organs and vital processes. This is followed by a very complete discussion on embryology in its relation to defects, one of the best chapters in the book. Last comes a series of chapters on modern aspects of psychology.

The author has succeeded in an ambitious undertaking. Writing in an easy and simple style he manages to elucidate various difficult conceptions by homely illustrations, and to carry his reader with him throughout. For the purpose for which it is intended the book could scarcely be surpassed, but it ought to appeal to an even wider circle. No better introduction to medical work could well be placed in the hands of a student, and we venture to think that there are few medical men who might not read it with profit.

Text-book for Fever Nurses. Revised edition. By GRACE H. GIFFEN DUNDAS, F.R.C.S.I., D.P.H. Camb. Edinburgh: William Bryce. 1924. Pp. 228. 4*s.* 6*d.*

THIS little book can hardly fail to be useful to fever nurses. It is divided into two parts, the first of which is devoted to anatomy and physiology and the second to the principles of fever nursing and to the characteristics of the infectious diseases. It supplies the information required by the syllabus of the Fever Nurses Association, and as the examinations have now been transferred to the General Nursing Council appendices have been added to this edition designed to meet the requirements of that body. The section on hygiene introduced with this object appears to us to be somewhat meagre; what little information is given about food stuffs and values might well be expanded in another edition. Information that the incubation periods of rubella, measles, and chicken-pox are "about a fortnight" is hardly adequate. Surely the possible limits of the incubation period in each case should be laid down with more exactness with a view to quarantine. Until the General Nursing Council has held more examinations it is difficult to know what standard is required. So far as we can judge, the fever nurse with a good knowledge of the contents of this little book should not fear the result, and many teachers may feel that the author's estimate of what a nurse should know is more reasonable than that suggested in the syllabus of the Council.

Dr. Dundas in her preface emphasises the need of careful study of the diagrams and models which all hospitals nowadays provide. Otherwise, if this opportunity were not available, the nurse would have little chance of profiting from the study of a book without illustrations. But to supplement hospital lectures and for the purpose of revision the book seems admirably adapted, and it has the advantage of being simply and clearly written.

The Care of Tuberculosis. A Treatise for Nurses, Public Health Workers, and all those who are interested in the care of the tuberculous. By J. A. MYERS, Ph.D., M.D., Assistant Professor of Preventive Medicine and Public Health, Graduate and Medical Schools, University of Minnesota. With an Introduction by RICHARD OLDING BEARD, M.D., Associate Professor of Physiology, University of Minnesota. London and Philadelphia: W. B. Saunders Company. 1924. Pp. 229. 10*s.*

LIKE many other authors of popular books on tuberculosis, Prof. Myers found, after teaching nurses the elements of tuberculosis, that it was desirable to summarise his teachings in a book. It seems almost inevitable that lecturing on tuberculosis for a certain number of years should culminate in this manner, and though few of the books belonging to this class are likely to enjoy a wide circulation for this reason, among others, that they are so numerous, they are calculated to be most useful to the tuberculosis workers in the author's sphere of influence. Some of us can best acquire information by the ear, and others by the eye; and the teacher most likely to transfer his knowledge successfully to others is he who employs both means. Of the book it is necessary only to say that it gives a perfectly sound and impartial account of the most salient features of our present knowledge of tuberculosis. There are few specialists in tuberculosis whose knowledge thereof is not impaired by fads and foibles. The author may not be bereft of these afflictions, but he certainly does not impose them on his readers. In his account of artificial pneumothorax he mentions a fact, not generally known, that Dr. E. L. Trudeau, "after having suffered at intervals for nearly 40 years from pulmonary tuberculosis, was entirely relieved of symptoms from the date of the collapse of the diseased lung, two years before his death, resulting from other causes, at the age of 67 years."

ADVENTURES IN TRIPOLI.

A Doctor in the Desert. By ERNEST H. GRIFFIN, D.S.O., M.C. London: Philip Allan and Co. 1924. Pp. 298. 10*s.* 6*d.*

FEW men have greater opportunities for indulging their tastes, should these lie in the direction of travel and adventure, than the doctor. Explorers, prospectors, and hunters are always prepared to include medical men in their parties, and when the nations are at variance the demand is so great from all branches of the fighting services and their allied organisations that even the naturally stay-at-home doctors find themselves pitchforked into queer places.

Dr. Griffin, being very far from a stay-at-home, seized the opportunity offered by the Italian annexation of Tripoli. In the autumn of 1912 he took service under the British Red Crescent Society, and his book records his experiences during the months in which he served with the Turks and Arabs. Like some others who have lived among them, Dr. Griffin is full of sympathy and admiration for the Turk. He does not see him as the blood-stained monster of the Gladstonian tradition, but as a courteous and humane gentleman; and whether or no personal bias has coloured his narrative in this direction it would be well if those who allude always to the Turk as unspeakable would read of the distress caused among the Turkish officers on hearing of the atrocities committed by the invading Italian troops in the frontier Turkish villages. But in writing well of the Turks, Dr. Griffin does not fail to do justice to the way in which the present Italian Government are treating the inhabitants of the new Italian colony, which enjoys due civic and political liberties.

The many episodes of a long adventure which form the contents of this easily flowing narrative are well written as well as exciting, owing much of their interest to their diversity and the suddenness of their occurrence. And interspersed with these, with political reflections, and with detailed descriptions of medical work, we have notes on the geography, climate, and natural history of Tripolitana, which may be neither new nor profound, but which bring the scenes into the reader's eye with vividness, some good and well-selected pictures helping to the same end. When the Turks evacuated the country, Dr. Griffin remained behind to minister to the wants of the Arabs, among whom he made many close personal friends, but the closing chapters, which are among the most stirring in the book, show that his interest in Arab civilisation nearly cost him his life, and that his final escape was a hair-breadth one.

The book is one that should be read widely, for in every line it breathes that spirit of comprehension and tolerance which, if it infused the governments of

the world, would clear up many of the situations which now eventuate in war. There is one side of Dr. Griffin which would hold that such a consummation is worth all the effort that mankind can put out; and there is another side of him, equally revealed in his book, which would find a world without wars a colourless and dull affair.

JOURNALS.

JOURNAL OF PHYSIOLOGY. Vol. LIX., Nos. 4 and 5. 1924.—Twenty-four Hours' Observations on the Metabolism of Normal and Starving Subjects, by I. Cohen and E. C. Dodds. The urine of five normal men, three taking food and two starving, was examined at half-hourly intervals for 24 hours in order to determine the half-hourly variations of the urinary constituents, and if possible to assign some cause and also to determine to what extent exogenous factors operate. The majority of the blood constituents remained remarkably constant over a given period. There seems to be no material change in the urea-concentration of the blood because of changes in the level of the nitrogenous metabolism. The only blood constituent showing any marked variation is glucose. An alkaline tide is, it seems, associated with meals, and more particularly with gastric secretion. After breakfast there was a rise in the alveolar CO_2 tension, which corresponded with the secretion of HCl from the stomach, a slight rise in the pH of the urine, a fall in the A+N value, a fall in the ammonia coefficient, and a rise in the nitrogen coefficient. These changes were all reversed a little later when pancreatic secretion began to flow. This evidence supports very strongly the original contention of Bence Jones. The evidence of acidosis was present even after so short a period of starvation as 24 hours. The marked variations in the urinary diastase could not be attributed to meals, since variations occurred in the starvation controls. The urinary diastase content would seem to be quite independent of the intake of food. All the results emphasise the uselessness of analysing isolated specimens of urine, and of basing conclusions on short-time observations without rigid starvation controls.—Influence of CO_2 on the Absorption of Alcohol by the Gastric Mucosa, by Nora Edkins and Margaret M. Murray.—Influence of the Ovary on Pituitary Secretion, by W. E. Dixon and F. H. A. Marshall. (See Annotation, p. 243.)—Influence of Insulin on the Blood-sugar in the Heart–Lung Preparation, by F. Plattner. The experiments were made on dogs, 1 g. of glucose being added to the circulating blood. On the subsequent addition of insulin to the blood there is no increase in the rate of disappearance of blood-sugar so long as the heart-rate is not increased, but if the heart-rate increases after the addition of insulin the sugar disappearance is found to increase in the same ratio.—Mechanism of the Splenic Reaction to General CO Poisoning, by S. de Boer and D. C. Carroll. In animals poisoned with CO there are differences in the COHb content between the hæmoglobin of the splenic pulp and the arterial blood. The experiments were made on anæsthetised cats with a mixture of air and CO of known composition, and the B.P. and splenic volume recorded. In cats poisoned with CO the spleen volume decreases, the B.P. falls if the rate of poisoning is rapid, and either falls slightly or remains constant if the CO is slowly absorbed. The mechanism is very sensitive and responds to as low a percentage of COHb in the blood as 8 per cent. The decrease in volume of the spleen is independent of the B.P. changes, and is due to an active contraction of the spleen musculature. CO poisoning does not cause any vaso-constriction in the spleen. The excised surviving spleen does not contract, but dilates, when poisoned with CO, an effect due to oxygen-want. The spleen does not contract in response to general CO poisoning of the animal when it is removed from nervous connexion with the body, either by nicotine poisoning or by decentralisation, although in each case the spleen itself is poisoned with CO. The contraction is not due to an effect on the adrenals or on the pituitary body. The spleen perfused with oxygenated Ringer but in normal nervous connexion with the body contracts when the animal is poisoned with CO. The spleen of the decerebrate cat contracts in response to general CO poisoning. It is concluded that the spleen contracts owing to the effect of CO in producing an oxygen-want in the spinal cord, and it is suggested that a function of the splenic contraction is to expel unpoisoned red cells into the blood, and so reduce the proportion of COHb to HbO_2 in the general circulation.—The Action of Pituitrin on the Splenic Volume. The same authors find that pituitrin does not cause a contraction of the excised spleen. The decrease in splenic volume which follows the intravenous injection of pituitrin in the intact animal is due to vaso-constriction. Pituitrin is without action on the plain muscle of the spleen.—Migration of Ova in the Rabbit, by A. S. Parkes. Ovariotomy on one side and salpingectomy on the other side make breeding conditional upon external migration of ova. Six rabbits operated on in this manner were successfully mated for three to four months without becoming pregnant, and showed no signs of pregnancy when killed. Ovarian excision and salpingectomy on the same side was found not to prevent pregnancy. It is concluded that external migration of ova is very rare.—Effect of Certain Changes in the Perfusate upon the Isolated Auricles of the Rabbit, by E. Cowles Andrus.—The Heart Output During Respiratory Obstruction, by A. St. G. Huggett. The method employed on intact urethanised cats is described. The minute-volume and stroke-volume were measured during inspiratory, expiratory, and combined expiratory and inspiration obstruction (against a measured water pressure). Inspiratory obstruction increases the minute- and stroke-volumes of the heart. It causes an increase in oxygen consumption and a fall in the utilisation. Expiratory obstruction causes the exact reverse in all respects. Combined inspiratory and expiratory obstruction causes a decrease in the oxygen consumption and in the minute- and stroke-volumes. The oxygen utilisation is increased. The pulse-rate undergoes only a slight change. The circulation-rate is approximately proportional to the output per beat.—Action of Adrenalin on the Central Nervous System, by A. St. G. Huggett and J. Mellanby.—Latent Glandular Hermaphroditism: New "Unbolting" Experiments, by Alexander Lipschütz. The author has shown that the hormonic effect of an ovarian graft in the male is favoured when the testicular mass is reduced experimentally. With intra-testicular or intra-renal ovarian transplantation, in all cases in which one testicle was removed, a feminine hormonic effect was produced and the time of latency shortened. There was never a feminine hormonic effect when both testicles remained untouched in the body of the engrafted animal. These results give support to the view that there is an antagonism between the graft and the sex glands *in situ*. In a male guinea-pig with one ovary engrafted, both testicles being retained, the results were negative for seven weeks. Then both testicles were removed, and in less than ten days the feminine hormonic effect on the teats became manifest. It is like an obstacle or bolt being removed which so far inhibited the manifestation of the feminine hormonic effect. This is why the author uses the word "unbolting" to such experiments. The author regards those cases in which an ovarian graft "takes"—i.e., becomes implanted and vascularised—in the male, notwithstanding the presence of both testicles, as "latent glandular hermaphrodites," in which the hermaphroditism becomes somatically manifest after the antagonistic influence is suppressed. The simplest method of rendering manifest somatically the intersexual condition of similar cases is testicular castration (the "unbolting" experiment).

THE LANCET.

LONDON: SATURDAY, JANUARY 31, 1925.

THE ROYAL COMMISSION ON NATIONAL HEALTH INSURANCE.

MEMBERS of the medical profession throughout the country have been invited to consider during the present month the draft of the memorandum proposed to be placed before the Royal Commission on National Health Insurance by the appropriate Committee of the British Medical Association. This memorandum was summarised in our issue of Jan. 10th. It is evident from its scope that questions of far-reaching importance to the whole profession will come under the review of the Commission. It would be an idle and inappropriate figure of speech to say that the medical profession is at the parting of the ways. This was true in 1912, when the decision was taken to accept the national health insurance system on trial, and a majority of the general practitioners of this country were, in effect, enlisted in a vast new branch of public service. A system which for 13 years has provided medical treatment for practically the whole wage-earning population, now numbering 15 millions, and which, as appears from the evidence, enrols 12,000 out of the 18,000 general practitioners engaged in actual practice, has clearly come to stay.

The vexed question of remuneration which has unfortunately occupied far too prominent a place in the picture in the past is, for the time being, at rest, although new manifestations of it may arise if some of the developments discussed in the British Medical Association's memorandum should materialise. It is these developments to which, at their local meetings, the members of the profession have been applying their minds, and we think it wise that those who are not engaged in panel practice should have been invited to consider with their colleagues the whole of the vital questions of policy raised in the memorandum. These embrace such enormously important matters as the desirability of including the dependants of insured persons within the insurance scheme, the future position of patients now under the Poor-law, the question of the extension of the scope of the present medical scheme so as to include specialist and consultant services, and the possible disappearance of insurance committees and Poor-law guardians and the transfer of their functions to a new local health authority. Before the views put forward by these local gatherings of the profession are considered in council by a central body of representatives in March, we hope to lay before our readers a summary of the evidence given on behalf of the Minister of Health and the Scottish Board of Health as to what the insurance scheme—and not merely the medical benefit provisions—really comprises and how it has worked. This evidence gives us for the first time a comprehensive picture of the insurance system which can be summarised in a fairly short compass, and we get a considered and responsible expression of opinion of the working of that system. The official view as to possible developments will, it is understood, come later when the evidence of the medical profession and of the societies and other bodies working under the Act has been heard by the Commission.

We hope, following the first instalment of evidence in this issue which deals with the general scope of National Health Insurance, to give rather more fully, in perhaps three or four instalments, the official evidence as to the medical benefit system. This will be followed by a concise account of the evidence of the more important approved societies, of special points of interest in the working of the scheme in Scotland, and by a short review of the financial structure of the Insurance Acts and of the cost of their administration. In this way, while avoiding matters of detail too remote from their daily work to be of interest to medical practitioners, we shall hope to have placed our readers in possession of the more interesting features of the whole of the evidence given by the time the witnesses on behalf of the profession appear before the Commission in April. Thereafter each instalment of evidence will be summarised as it appears.

THE ACTION OF GOLD ON TUBERCULOUS TISSUES.

THE efforts to enlist gold in the therapy of tuberculosis have extended over many years. Hopeful results have been claimed by certain observers and others have been baffled and discouraged by the sharp reaction that has followed the administration of this metal. During the last year there have been persistent rumours from Denmark that the long awaited specific has been found and the full account of the preparation of gold synthesised by Prof. HOLGER MOLLGAARD has been eagerly looked for. His recently published book[1] sets out at some length the observations on which his claim is based. Sanocrysin, a white crystalline solid originally prepared in 1845 by FORDOS and GÉLIS, is a double thiosulphate of sodium and gold with the formula $3Na_2S_2O_3.Au_2S_2O_3.4H_2O$. By the original method only some 15 per cent. of the gold employed emerged in the finished product, but Dr. MOLLGAARD and his collaborators speak of a new synthesis which utilises 95 per cent. of the gold and gives a pure product after a single crystallisation. The right of producing this compound, registered under the name of "Sanocrysin," has been vested in the Danish Chemo-Therapeutic Company, of Copenhagen, and it will then be supplied, as we learn from the *Northern News Service*, to hospitals either directly or through some special institutions nominated by the Government. It is unfortunate that Dr. MOLLGAARD gives no indication in his book how the synthesis is achieved, for he cannot be willing for others to use an expensive and inferior method of synthesis when he knows of a better.

The chemical and physical properties of sanocrysin are dealt with in the book in great detail. One important property of the substance is that it does not ionise into true Au ions; metallic gold is only found on slow oxidation, and the authors believe that this process, if it were to take place in the body, should be of therapeutic value. The next section is devoted to what are called the "bacteriothropical" properties of sanocrysin. Sanocrysin in dilution of

[1] Chemotherapy of Tuberculosis: Experimental Foundation and Preliminary Clinical Results. In collaboration with Prof. Dr. V. Bie, Blegdams Hospital, Copenhagen; Dr. O. Chievitz, Finsens Lysinsttut, Copenhagen; Dr. J. Gravesen, Vejlefjords Sanatorium, Vejle; Dr. G. E. Permin, Frederiksberg Hospital, Copenhagen; Dr. K. Secher, Bispebjerg Hospital, Copenhagen; Dr. Strandgaard, Boserup Sanatorium, Roskilde; Dr. C. H. Würtzen, Oresunds Hospital, Copenhagen. By Holger Mollgaard, Prof. of Physiology, Physician, Royal Veterinary and Agricultural College, Copenhagen. Nyt Nordisk Forlag: Arnold Busck, Copenhagen. 1924. Pp. 419 and many plates. 25*s*.

one in a million and under is found to inhibit the growth of the tubercle bacillus in vitro, but the proof of actual bactericidal properties is rather vague. After washing inhibited cultures (method not given, nor any proofs that all the heavy metals had been removed) growth did not take place in bouillon, but if the cultures were injected into guinea-pigs, generalised tuberculosis developed. The further guinea-pig experiments do not carry us very far. The method adopted was to inject living culture and immediately to follow this by an injection of sanocrysin at the same site. The pigs were thereby protected from generalised tuberculosis in the majority of cases. The authors themselves evidently realise the fallacies attending this method, since they state (p. 31): "Owing to this fact and further because preventive experiments, where the therapeutical stuff is injected direct into the infected place, are of minor interest, many other chemical stuffs probably being able to kill tubercle bacilli when directly applicated on them. I have made only few experiments of this kind." The next chapter is devoted to the effect of sanocrysin on non-tuberculous animals. The general conclusion arrived at is that it is non-toxic in doses of 0·2 g. per kilo of body-weight. Slight albuminuria may result. Renal function was judged by the excretion of administered iodine, an unfamiliar test in this country. If the test animal has any infection other than tuberculosis, the administration of sanocrysin is often followed by marked renal change; the authors remark that for the present "Sanocrysin should never be injected into organisms affected with other infectious diseases than tuberculosis." This observation, if confirmed, would restrict the use of the remedy considerably, since secondary infections in tuberculosis are extremely common. The authors then deal with the results of sanocrysin injections upon tuberculous animals. To put it briefly, these were followed by shock and rash, similar to tuberculin shock, which could be prevented, in most cases, by the administration of serum from a tuberculous animal. The authors assume that these results are due to the bactericidal effect of the sanocrysin, endotoxin being liberated, but other explanations might be advanced. Tuberculin shock may be produced, for example, by purely physical means, such as massage and exercise, and the sanocrysin might act by merely damaging the tissues and washing out bacteria and toxins. LYDIA M. DE WITT, writing [2] of the significance of these tuberculin reactions following the injection of gold salts, says: "From all experiments, we may conclude that the use of gold salts is not without danger. When active, the actions seem associated with marked hyperæmia and possible hæmorrhage in the neighbourhood of the tubercles." The most hopeful experiments recorded by Dr. MOLLGAARD are those with calves which were infected by intravenous injection of cultures, one animal being selected as a control and the remainder being treated with sanocrysin. The latter failed to develop tuberculosis, whilst the sole control died.

The literature of gold therapy being what it is, it is hardly surprising to find Dr. MOLLGAARD'S historical outline incomplete in some particulars. Thus there is no reference to the work of J. B. WHITE,[3] who used a double chloride of sodium and gold, together with manganese chloride, and described promising clinical results, nor to that of MAYER,[4] and many other workers, such as BETTMANN, JUNKER, POOR, and GEBER, who have made similar investigations. Perhaps the most serious omission is that of the important paper by DE WITT, CADWELL, and LEAVELL,[5] who studied the effect upon tuberculous animals of gold administered by mouth, intravenously or subcutaneously. They controlled their experiments by analysis of the tissues, and found that there was more gold in the tuberculous areas. Later DE WITT and SHERMAN extended these observations and their paper contains the following highly-important statements: "The stimulation of growth of tubercle bacilli by solutions of gold too dilute to kill or to inhibit is an important consideration in treatment, since it is difficult to keep the concentrate of gold in the animal body at or above the point required for inhibition." It may be that Dr. MOLLGAARD and his collaborators have not given full consideration to the case against gold therapy, and it is therefore the more disappointing that the product was not passed on at an earlier stage to other experimental workers for trial and confirmation. We have not been considering here the clinical trial of the remedy, with which more than half of the book deals. Clinical trial in tuberculosis, as experience has shown, is a ticklish affair.

[2] H. G. Wells, L. De Witt, and E. R. Long: The Chemistry of Tuberculosis. Williams and Wilkins Company, Baltimore, U.S.A. 1923. Pp. 397.
[3] Amer. Med. Surg. Bull., N.Y., vii., 1894, 388.
[4] Deutsch. Med. Woch., 1913, xxxix., 1678.

SIR JAMES MACKENZIE.

THE death of Sir JAMES MACKENZIE removes from the ranks of medicine one of its greatest figures, one of the men who make medical history, and who, while accomplishing much themselves, provide a firm platform from which future researches can be carried forward. He regarded his work mainly as an illustration of what the well-equipped general practitioner of the future might do, and was never tired of pointing out what a mine of knowledge was here left unquarried. At a time when he was a recognised authority all over the world on the manifestations of heart disease, their significance, and their treatment, he acclaimed himself as a development of the general practitioner, inasmuch as all his working life up to that date had been done in general practice; and looking back at that work he would express his belief that to the men in general practice the whole field for future discovery was open. His own history supported the force of his words. His results were the direct outcome of the minute observation of groups of patients under his personal care in circumstances where their conditions could be followed up, and where, as analogous symptoms appeared, definite research along indicated lines could be made. The first subject to which he would direct his attention while taking these exhaustive notes was pain, and his investigation into the character of pain in a large number of cases of visceral disease compelled him to differ from accepted views as to the possibility of defining precise superficial areas of altered sensation. He used all the chances offered by a mixed general practice to look below accepted knowledge, which he found confessedly unable to explain many symptoms or to suggest remedies in many circumstances; and with the splendid intention of setting such a condition of things right to some extent and in some direction he embarked upon an intensive study of cardiac disease. How his recognition and analysis of cardiac irregularities led in time to fundamental changes in diagnosis, prognosis, and treatment is indicated in our obituary notice, the last phase of his labours being sympathetically delineated through his collaborators. To the vast general deductions that characterised this phase no summary would do justice at the present moment; but to the works that he accomplished the highest acclaim is due. Mackenzie was one of the small group of men whose individual labours have revolutionised fundamental medical views.

[5] Jour. Inf. Dis., 1918, xxiii., 425; Jour. Pharm. Exp. Therap., 1918, ii., 357.

Annotations.

"Ne quid nimis."

VITAL STATISTICS FOR 1924.

THE Registrar-General has issued a provisional statement of the figures for birth-rate, death-rate, and infantile mortality during the year 1924.

—	Birth-rate.	Death-rate.	Infant mortality-rate.
England and Wales	18·8	12·2	75
105 county boroughs and great towns, including London ..	19·3	12·3	80
157 smaller towns	18·9	11·2	71
London	18·6	12·0	69

The smaller towns are those with an estimated population in 1921 of 20,000–50,000. The (crude) death-rate for England and Wales relates to the whole population, but that for London and the groups of towns to the civilian population only. The birth- and infantile mortality-rates for London have been provisionally corrected for transfers.

The Registrar-General remarks that the birth-rate of England and Wales as a whole is the lowest recorded except during the war years 1917–19. The death-rates are all appreciably higher than last year. These provisional figures, which are not likely to require substantial modification, have been issued for the information of medical officers of health.

THE CLAIMS OF THE DEFECTIVE CHILD.

ARREARS in the educational provision for defectives are serious. At the present time the accommodation available in special schools is sufficient for only 41,000 out of the 150,000 blind, deaf, physically and mentally defective, and epileptic children in England and Wales. More than half the day-school places are in London, and many education authorities do next to nothing for their unfortunates. The arrears of a decade cannot, of course, be made up in a day, but the Board of Education is pressing[1] local authorities to consider carefully which class of child shall have priority. The medical branch of the board would very sensibly give precedence to the claims of the blind and deaf. It is disconcerting to learn from Sir George Newman's report for 1923 that in 208 areas alone 281 totally blind and 484 totally deaf children were either attending ordinary schools in which they could obviously derive no benefit or were getting no teaching at all. Irreparable damage to mind, character, and power of acquiring technical skill follows such neglect in childhood, and the Board's patience is at last becoming exhausted, for, runs the circular, "the Board will not be prepared much longer to regard any authority as reasonably complying with the Education Act, 1921, unless all blind and deaf children in the area are properly ascertained and provided for." Except in large towns with at least 40,000 children on the rolls, day classes are impracticable and more institutions are needed. It is important that these should be well distributed over the country, as there are valid objections to sending young children great distances from home and much of the existing accommodation is for this reason wasted.

In discussing the position of the "physically defective" child, who in practice is usually a cripple, the Board realises that the most effective measures can be taken outside the school. A good orthopædic scheme covering town and country districts in an area will, it is pointed out, cut off the supply of cripples at the source and will largely obviate the need for the expensive special schools of the older type. Such schemes are simple and inexpensive to run and in several areas they have already revolutionised the prospects of the child with crippling disease or deformity. It is still possible, however, to find a P.D. school complete with costly ambulance service, and hardly a cripple child on the roll under surgical treatment or in a splint. The Board does well to guard against the reproduction of such anomalies. For the "mentally defective" child, on the other hand, preventive measures are not available and their education remains a problem as "costly as it is difficult." About 28,000 are now unprovided for. The special education they need must be given in small classes by specially trained teachers or it is not worth giving. Nothing is more certain, however, that such children if neglected in early life take their revenge on society later by a social inefficiency which expresses itself in pauperism, crime, and vice. It is suggested by the Board that even where special education cannot for various reasons be provided, an education authority should at once take certain inexpensive steps which are the foundations for any efficient scheme. The number of defective children should be correctly ascertained, such as cannot be accommodated in special schools should be supervised by skilled visitors trained to advise and help parents; and at school-leaving age such children as are likely to need permanent care and control should be notified to the Mental Deficiency Committee Like the other schemes outlined in the circular, these measures, though admittedly incomplete, should add materially to the happiness and security of these unfortunate children and of their families.

[1] Special Schools for Defective Children. Circular 1349 to Local Education Authorities, Jan. 12th, 1925.

SURGICAL TREATMENT OF PARALYTIC DEFORMITIES OF THE FOOT.

WRITING on this subject in the *American Journal of Surgery* for December, 1924, Dr. Leo Mayer, of New York, sums up usefully the history of tendon-transplantation and other procedures intended to correct the deformities and disabilities of infantile paralysis. He describes with commendable fullness the details of the operations which he himself has been accustomed to perform, details which, though they may seem trivial, make all the difference between functional success and failure. For, though the operation wound may have healed readily and the transplanted tendons may be firmly attached at their new insertions, the object of the operation will not be secured if the direction of action of each transferred tendon has not had due consideration, or if there are adhesions between it and adjacent structures. Dr. Mayer describes the operations upon bone, which he has found necessary in the more sev re d resistant deformities, with or without concomitant tendon-transfer. He gives some good reasons for preferring the measures which he describes in cases of talipes calcaneus, to the operation devised by Royal Whitman, which has the disadvantage, in a unilateral case, of still further shortening an already short limb.

FACIAL SURGERY.

Two books[1] have recently appeared on cosmetic surgery. The one deals with surgical trivialities, little alterations in the form of lips or eyelids which might appeal to a woman of fashion or of vanity. The other plunges straight away into the most ghastly injuries that even civilised warfare has been able to achieve, and indeed it is in the late war that it found its origin. Yet it is common knowledge that the dimensions of a defect bear no relation to its effect upon the patient, and that to a woman with nothing but herself to think of a slight droop of an eyelid may seem as terrible as the loss of half his face to a healthy man. It is, indeed, in its application to the

[1] Facial Surgery. By H. P. Pickerill, C.B.E., M.D., M.S., Lieut.-Colonel, N.Z.M.C., Surgeon-in-Charge of Facial and Jaw Department, Dunedin Hospital; Membre d'Honneur Société Belge de Stomatologie; late Surgeon-in-Charge of the New Zealand Section, Queen Mary's Hospital, Sidcup. Edinburgh: E. and S. Livingstone. 1924. Pp. 162. 21s. Cosmetic Surgery. By Charles Conrad Miller, M.D. Philadelphia: Davis Company. 1924. Pp. 263. $4.

minor defects of civil life that the work of the plastic surgeon of the war finds its outlet at the present day, and indeed some of these defects produce really serious deformity. Mr. Pickerill was one of the group of surgeons who worked in the later years of the war at the great hospital established by Queen Mary at Sidcup for the treatment of facial injuries, and he can claim his share in the advances made by the combined efforts of that group. The first part of his book deals with the methods which were there elaborated, and by many examples he illustrates their application to facial injuries of every degree and character. Excellent photographs and neat line drawings enable the reader to follow the operative steps, often very complex, by which the injuries were repaired and to appreciate the excellence of the results. The remainder of the book demonstrates the application of the methods to the more moderate requirements of civil life, such as the filling of defects due to the removal of growths, to lupus, syphilis, and other conditions. In a chapter on deformities he deals with hare-lip and cleft palate, and describes a new and interesting method of dealing with the latter condition. Though we may not always agree entirely with the methods advocated, the book is full of interest and suggestions, and we can strongly recommend it to the notice of all surgeons who aspire to deal with facial deformities. Dr. Miller deals solely with the lighter side of plastic surgery; his book is of real value in that it calls the attention of surgeons to the possibilities of a branch they are apt to neglect. The operations described are all done under local anæsthesia and they range between the correction of a hump nose in a bruiser and the dainty formation of a dimple in a lady of fashion. It is unfortunate that no photos of actual cases are given to enable us to compare the lustre of these reconstructed gems with that of the genuine article. But the methods advocated are logical and sound in conception, and although they seem very simple anyone who is skilled in the art will appreciate the nice judgment they require. The surgery of beauty is a risky field for the amateur, but those who master its principles will find its problems not without interest.

ARSENIC IN THE URINE.

IN the current issue of the *Analyst* an important paper appears by Mr. H. E. Cox, M.Sc., Ph.D., on the determination of small quantities of arsenic, and on the occurrence of this element in normal urine and in fish. The stimulus to Dr. Cox's work was given by the work of the Commission on Arsenic Poisoning in Sweden, whose report appeared a year ago (THE LANCET, 1923, ii., 531). Much of the value of both rests on details of experimental technique; both the Swedish Commission and Dr. Cox stress the importance of the complete destruction of all the organic matter present in the substance being assayed for arsenic, as fully as is done in the Kjeldahl process of estimating total nitrogen. The subsequent complete removal of nitric acid and nitric oxides is also essential for, unlike the Kjeldahl process, the addition of nitric acid is part of the method, the excess being removed by adding a considerable quantity of ammonium oxalate. It is stated that unless the organic matter is thus destroyed the arsenic is not rendered soluble or left in a form suitable for estimation by one of the well-known methods. While, no doubt, this is true, it must be borne in mind that a far larger quantity of reagents must be employed in each such test than is required for the older process where the organic matter is only partly destroyed. Dr. Cox states in one place that he used arsenic-free reagents and in another that his blank control always showed the same minimal figure which was constant. The term "arsenic-free" as applied to reagents is relative; it is impossible to obtain reagents literally free from arsenic. Many reputable chemical manufacturers label their strong acids "arsenic less than 0·1 part per million," and many samples of reagents contain less than this quantity. It becomes necessary, therefore, to exercise caution, especially regarding some of the smaller values before accepting the conclusions either of Dr. Cox or of the Swedish Commission, especially as according to the former the amounts taken of his reagents contained in some cases as much arsenic as the amount of urine taken for experiment contained. This was, of course, allowed for, but it cannot be regarded as satisfactory when dealing with very minute amounts. The following tables give the Swedish figures for urine and fish:—

Urine.

One hundred persons on a known hospital diet:—

As_2O_3 mg. per litre.	Percentage of cases.	As_2O_3 mg. per litre.	Percentage of cases.
0·00–0·01	21·1	0·10–0·20	21·1
0·01–0·03	18·4	0·20–0·30	2·6
0·04–0·06	23·7	0·30–0·70	5·2
0·06–0·09	7·9		

Dr. Cox expresses the opinion that the arsenic figures given are rather too high.

Fish.

	Mg. of As_2O_3 per 100 g. of fish.		Mg. of As_2O_3 per 100 g. of fish.
British—		British—	
Whiting	0·04	Haddock	0·06
Plaice	0·14–0·30	Brill	0·03
Sole	0·03	Mackerel	0·05
Hake	0·03	Halibut	0·03
Herring	0·03	Turbot	0·05
Cod	0·05		
Swedish—		Swedish—	
Mackerel	0·01	Plaice	0·05–0·09
Herring	0·03	Sole	0·01
Haddock	0·02	Cod	0·04

Dr. Cox's figures for urine (hospital patients):—

	Mg. of As_2O_3 per litre.	Mg. of As_2O_3 per day.
16 cases	0·00–0·09	0·00–0·09
Four cases on fish diet—		
1.	0·10	0·18
2.	0·25	0·19
3.	0·58	0·61
4.	0·33	—

It will be seen that in the main the figures are in agreement, and the interesting point emerges that some of Dr. Cox's higher values for urine were in patients partaking of a fish diet. This fact may be of importance in regard to patients recovering from a possible sublethal dose of arsenic, as, of course, fish is a common diet of convalescence. It must also be remembered that the B.P., 1914, arsenic limit of various drugs varies from 0·2 to 10 parts of arsenic per million, with certain exceptions. Although high-grade chemicals rarely, if ever, reach these limits, many hospitals for reasons of economy use less pure chemicals, adopting the B.P. as their standard. Certain observers in the past have found traces of arsenic frequently in the urine of healthy persons, but others have often examined urines taking for estimation far larger quantities of urine than Dr. Cox took, and have obtained negative results. No doubt this failure might be attributed to the want of employment of Dr. Cox's technique. The present position is one of difficulty. It may be fairly accepted that arsenic is present in the urine far more frequently than was previously suspected, but not, we venture to think, quite as frequently as Dr. Cox maintains. From the medico-legal standpoint his work will require some consideration, but where a possible fatal dose of arsenic has been administered the amount found in the urine and fæces within a reasonable time of the dose would be far greater than the amount found in the fish diet cases, and would be associated with clinical symptoms. It is, therefore, not very likely that Dr. Cox's discoveries will seriously complicate the medico-legal issue. As an example of the rate of excretion of arsenic we understand that, by the old method, arsenic has been found in the urine and fæces of a patient for 14 days after the administration of liq. arsenicalis ℥iii. t.d.s. for one day (9 minims in all). By the fifteenth day it had disappeared and none was detected during the next two days.

SOUTH AFRICAN MINE DUST.

IT is some years since the pioneer methods of dust-sampling as practised in the South African gold mines first attracted and held the attention of those interested in the study of silicosis. There are two methods concerned—namely, the gravimetric (or sugar-tube) method in which dust is weighed, and the so-called konimetric (Gr. κόνις, dust) method in which the particles are counted with the aid of a microscope. General confidence in these methods has apparently diminished because the gravimetric returns, though reliable within their limitations, did not afford the necessary information; while lack of correlation between the konimetric returns of different observers or groups of observers, and their not infrequent lack of correlation with simultaneous gravimetric returns, has shaken confidence in this the alternative method. In a well-illustrated monograph,[1] which has recently come into our hands, a group of workers at the South African Institute for Medical Research review the position as it appears to them on the Witwatersrand, and present their most recent technique for standard routine sampling in the mines whilst actually at work.

Dr. Mavrogordato states that, in 1911, 25 per cent. of employees contracted silicosis, developing the symptoms within a couple of years; in 1917 only about 6 per cent. of workers were affected by the disease, and they were now taking from nine to ten years to develop the symptoms; and in 1922 less than 3·5 per cent. of the men employed were contracting silicosis, and they required from nine to ten years to develop symptoms. He also points out that the results of "dust surveys" in 1915 registered by the gravimetric method an average of 4·9 mg. of dust per cubic metre of air, whereas in 1919 the average had fallen to 2·9 and in 1923 it was only 1·3. It is obvious, therefore, that the diminution in the amount of silicosis has gone hand in hand with the diminution in the dust content of the air, as measured by their methods, and this fact should give confidence in the value and reliability of these methods. He is very careful to make clear that the routine methods at present in practice, although the best available under actual working conditions in the mines, are by no means perfect, and there are still difficulties to be surmounted. Dr. Mavrogordato prefers the konimetric method for routine sampling to the gravimetric method because the former is less trouble, demands less skill and less equipment, while at the same time it gives more prompt returns. In taking the sample of dust the konimeter (Kotzé or circular pattern) causes a small volume (5–10 c.cm.) of air to pass at a high and definite velocity, through a standard narrow jet, and to impinge upon a glass slide covered with adhesive material (glycerine jelly). The dust particles are counted with a microscope giving a magnification of × 120, using a fixed and standard illumination, and also a special arrangement of stop and condenser to obtain a definite dark-ground illumination so as to evade the ultra-microscopic effect as far as possible, since ultra-microscopic particles of silica are either innocuous or non-existent; large particles of silica are also comparatively unimportant, the particles producing silicosis measuring from 5μ–0·25μ. When it is the latter alone that would have to be counted by a perfect method, the difficulties in the way of introducing such a method are obvious. Nevertheless the standard routine described is considered to yield sufficiently approximate returns with a minimum demand on the operator. The drawback of the method is that it measures the total air-borne particles but not necessarily silica; the complications introduced by carbon, by fog, and by water-soluble particles have also to be considered, and some measures to overcome these troubles are described. Dr. Mavrogordato and his colleagues do not rest satisfied with the present routine methods, and they hope to obtain the help of the dust-sampling committee of the Chamber of Mines, of the Mines Department, and of the Mine Officials to enable them to test more recently introduced technique, not only in a laboratory, but, what is of more importance to them, also under actual working conditions of the mines; these recent methods include Palmer's method, Read's method, Greenburg and Smith's method, Owen's method, and the electrical precipitation method. Dust, of course, collects in the air of mines, owing to absence of efficient through ventilation; local ventilation is of no value. Dr. Mavrogordato suggests that Dr. Leonard Hill's kata-thermometer, because it is able to detect ventilation currents and estimate velocity of air movement, may give more information as to undergound health conditions than any other single procedure; but we will require to know the minimum linear velocity which will keep dust diluted and which will dissipate any dust produced owing to some failure in the usual precautions.

It may surely be regarded as very creditable to have reduced the number of cases of silicosis from 25 per cent. in 1911 to less than 3·5 in 1923, an improvement which is attributed to the use of water to prevent dust production and also to some attempt to remove dust by mechanical ventilation. To reduce the case-incidence further, some fresh factor or factors must be introduced. Dr. Mavrogordato suggests (1) systematic through ventilation to the working places; (2) a preliminary treatment of the water used for spraying and washing down; and (3) perhaps the use of exhaust-hoods (Sheffield hood principle) in certain circumstances. There is evidence that "tube-trouble"—the machine water-tubes—may be responsible for intermittent exposure to relatively dense clouds of dust; it is considered that such intermittent exposure is the deciding factor in producing the disease in susceptible human subjects. The returns show that about 70 per cent. of the silicotic cases occur in men who have used machine drills at some time or other, although such men only amount to about 30 per cent. of the men employed underground at any one time. It seems reasonable then to suspect the machine-drills, and further research is planned to elucidate such problems.

[1] Publications of the South African Institute for Medical Research, edited by W. Watkins-Pitchford, M.D. No. XVII., The Value of the Konimeter—being an Investigation into the Methods and Results of Dust Sampling as at Present Practised in the Mines of the Witwatersrand. By A. Mavrogordato, M.A., M.R.C.S., L.R.C.P., with the collaboration of J. Boyd, J. Innes, E. MacEwen, A. Pulford, L. G. Ray, G. D. Maynard, J. Moir, E. Cluver. Johannesburg. 5s.

THE INFLUENCE OF THE OVARY ON PITUITARY SECRETION.

RECENT researches on the condition known as pseudo-pregnancy have a direct bearing on the problem as to the cause of parturition. In the dog, rabbit, and some other animals the corpus luteum persists during pseudo-pregnancy in the same kind of way as it does during true pregnancy, and the uterus and mammary glands undergo growth in correlation with the growth of the corpus luteum. In the rabbit, which normally only ovulates after coition, the condition of pseudo-pregnancy can be induced by permitting the doe to have a sterile coition (as with a vasectomised buck). The corpus luteum after being apparently functionally active eventually undergoes involution, and in association with this process the uterus also regresses and the mammary glands begin to secrete milk. There is no clear evidence that the ovary has any direct influence in bringing about parturition.

In the current number of the *Journal of Physiology* W. E. Dixon and F. H. A. Marshall describe four experiments in which extracts of whole ovaries of rabbit and sow were employed, and the precise stage of pregnancy or of the œstrous cycle noted at which the animals were killed. Boiled Ringer extract of ovaries—rabbit and sow—was injected into the vein in dogs, the cerebro-spinal fluid collected at suitable intervals, and its effect on the uterus of a virgin guinea-pig tested in the usual way. Dixon

had found that certain ovarian commercial extracts had an exciting effect on the pituitary gland when injected into a vein. If the cerebro-spinal fluid collected from this animal caused contraction of the virgin uterus suspended in Ringer's fluid, this showed that pituitrin had been secreted into the C.S.F. Normal ovarian secretion does not act directly in promoting uterine contraction, but does so indirectly through its action on the pituitary body. Moreover, this action is inhibited during pregnancy by the corpus luteum. The injection experiments show that in the presence of the fully formed and presumably functional corpora lutea, the normal ovarian secretion is largely in abeyance, and this is the condition for a short part of the time between the heat periods, but more particularly during pregnancy. The corpus luteum would seem so to dominate the ovarian metabolism at these periods that the ovarian secretion, which at other times activates the pituitary, is inhibited or else is neutralised by the secretion coming from the corpus luteum. At the close of pregnancy, when the corpora lutea are in an advanced state of involution, the normal ovarian secretory activity is once more produced, and the pituitary is excited to secrete in greater quantity. When the threshold stimulus of the pituitary secretion upon the uterus is reached and passed, the pains of labour set in and parturition results. The growing irritability of the uterus in the later stages of pregnancy is explained as being functionally correlated with the involution of the corpus luteum. The authors do not suggest that the ovario-pituitary endocrine mechanism is the sole factor in producing the labour-pains, as no doubt the fœtus itself acts as a direct stimulus. The onset of labour cannot easily be accounted for without postulating some further exciting cause apart from the fœtus and uterus. The authors agree that the phenomena attending the termination of pseudo-pregnancy point to the conclusion that the occurrence of a certain stage in the cyclic activity of the ovary is a factor in parturition.

Ovarian secretion accordingly does not bring about parturition by acting directly on the muscles of the uterus, although the secretion of the pituitary has a definite specific action on the muscles of the uterus; and the secretion of the ovary in the absence of fully formed (and therefore presumably functional) corpora lutea has a definite specific stimulating effect in promoting pituitary secretion. The secretion of the ovary in the presence of such corpora lutea, on the other hand, has no such effect, its action on the pituitary gland being completely negative. The corpus luteum so dominates the ovarian metabolism during pregnancy as to inhibit the normal ovarian secretion; but with the involution of the corpus luteum at the close of pregnancy the uterus shows an increased irritability, and eventually, when the ovarian endocrine mechanism is sufficiently re-established, the secretion, working through the intermediation of the pituitary, becomes an important factor in bringing about labour. The action of the ovary upon the pituitary undergoes a similar variation in the absence of pregnancy and during the œstrous cycle, the determining factor being whether corpora lutea are present or absent.

GERMAN LEARNING.

GERMAN medical science has sustained a heavy loss by the recent death of three eminent medical men, Prof. Strümpell, of Leipzic, Prof. Bumm and Prof. Morgenroth, of Berlin. Prof. Strümpell was born in 1852 in Dorpat in the Baltic Provinces of the Russian Empire, where his father held the chair of philosophy at the former German university. Strümpell began his career at the University of Leipzic, where he became assistant to Wunderlich, the physiologist, and to Wagner, the pathologist. He was later appointed ordinary professor of medicine at the universities of Erlangen, Breslau, and finally at Leipzic, where he remained until his death. Strümpell's work is well known; his great handbook of special pathology and therapy has been published in 25 editions, apart from many translations. His first work was on the study of renal diseases, but afterwards he devoted himself nearly exclusively to the diseases of the nerves. His researches on tabes dorsalis, muscular atrophy, infantile paralysis, neuritis, and traumatic neurosis were published in *Deutsche Zeitschrift für Nervenheilkunde*, of which he was the editor. Strümpell was a man of great culture; his style, both in speaking and writing, was clear and precise, and he was an accomplished musician. A few months before his death he finished his memoirs which have recently been published. Prof. Bumm was born in 1857 in Würzburg, Bavaria. He became assistant to Scanzoni at the university of his native town, the greatest German gynæcologist and obstetrician of the time. Having occupied the chair of gynæcology successively at the Universities of Bâle and Halle, Bumm was called to Berlin in 1904. His chief study was gonorrhœa in women, puerperal fever, and the treatment of cancer by radium. Apart from the pathological and technical side of women's diseases, he was much interested in the problems of population. His renown as a gynæcologist and obstetrician was very great, and he had, perhaps, the largest consultant practice in Germany. Latterly he suffered from gall-stones which, whilst he was on a holiday in Munich, produced a perforation of the gall-bladder, necessitating an immediate operation which unfortunately proved fatal. Prof. Morgenroth was less known to the general public than Bumm, as he was not engaged in private practice. He was born in Bamberg, Bavaria, and after his university training became an assistant to Ehrlich at Frankfurt, where he published his first researches concerning immunisation and hæmolysins. Having worked for some time at the German zoological station at Naples, he was appointed, after his return home, as assistant to the pathological institute of Berlin and afterwards became head of the chemotherapeutic department of the Robert Koch Institute. In this capacity he made his most important researches; he discovered optochin, a specific agent against infection by pneumococci, eucupin and vuzin, agents against the infection of wounds, which were successfully used during the war, and lately rivanol, a valuable agent against infection by staphylococci. He died at the age of 53 years from leukæmia.

THE INFLUENCE OF THE DRAMA.

PROPENSITIES which are labelled virtues or vices often are not so per se, and in a similar way it is easy to name a thing as a luxury and treat it as such when, if it were properly accepted in the scheme of life, it would be revealed as a necessity. This truism was neatly put by Sir StClair Thomson, the President at the social evening at the Royal Society of Medicine on Jan. 19th, in introducing Miss Lena Ashwell (Lady Simson) to the Fellows and their guests. He showed that it was possible to regard the arts as holding the same position towards the mental well-being of society as vitamins were considered to hold in relation to bodily health. Upon this introduction Miss Ashwell gave a witty and suggestive address on the Drama as a Necessity of Civilised Life. She described the organising of entertainment parties to operate in France, Egypt, Palestine, and other areas during the war, and proved, to an audience that wanted no convincing, the value of these parties to the morale of the forces. In this way and in many others the genuine interest which the mass of the population of this country take in the drama was, said Miss Ashwell, abundantly displayed, but, unfortunately, this old and necessary art was now giving place to an unworthy competitor, the cinema. This country, she continued, possessed the richest dramatic literature of any nation since the time of

the ancient Greeks, but it was only rarely that good plays, old-time or modern, could be seen even in the large provincial centres. The reason was partly that the taxation of the theatre as a luxury caused the production of good plays to be generally attended by a financial loss to those producing them, but this was only part of the story, the apathy of the populace being another contributing factor. It would be a national calamity if the drama were allowed to die out and the presentation of films, mainly preposterous and of transatlantic origin, should take its place, for the cinema influence was often deplorable, the aspects of life portrayed being unreal and vicious. Miss Ashwell's address was a vigorous plea for the recognition of the drama as a necessity in social life, alike as an educational medium and a source of refreshment.

DR. LOMAX AND HIS CRITICS.

IN November last we reviewed a pamphlet having this heading, which was written by Dr. Montagu Lomax as a reply to the personal references to himself contained in the report of the Committee on the Administration of Mental Hospitals, 1922. Dr. Lomax calls our attention to the fact that certain of his words—namely, "Governments do not go to the trouble and expense of appointing Departmental Committees to inquire into vague and unsubstantial charges"—were meant to imply that his charges were not of this nature, whereas in our article it is suggested that his charges were by his own confession vague and unsubstantial. This has caused him annoyance, but, while regretting that fact, we feel that Dr. Lomax, considering the charges which he has brought against others, should be slow to resent a small joke at his unlucky phraseology, and one which was so obvious that it cannot possibly have affected his position as a would-be reformer.

AN announcement has appeared in the daily press to the effect that Sir Harold Stiles is resigning the Chair of Regius Professor of Clinical Surgery in the University of Edinburgh, and a little explanation is required. Prof. Stiles's term of office does not expire until March 21st, his successor being appointed at the opening of the summer session, one month later. Prof. Stiles gave notice of his intention to vacate his chair to the authorities in order to give them ample time in which to appoint a successor, but the significance of Sir Harold Stiles's action lies in his resolve to withdraw from private practice simultaneously with his resignation of his University and hospital appointments. His professional colleagues will recognise that this is the action of a single-minded man, who has resolved that he will not create leisure in which to discharge private work by the easy process of giving up honorary or official duties.

THE LATE DR. J. D. WILLIAMS.—John David Williams, M.B., C.M.Edin., died on Jan. 23rd at Plasgwyn, Pentrefelin, Portmadoc, in his sixty-ninth year. He was the son of a farmer, and was born at Thewyddy, Llanfrothen, Merionethshire. He started life as a quarryman, but when 18 years of age he determined to become a schoolmaster, and having gained a scholarship qualified as a certificated teacher at Bangor Normal College. He subsequently became headmaster of schools at Llanidloes, Llfrothen, and Tanygrisian. Then he resolved to become a medical practitioner, and proceeded to the University of Edinburgh, where after four years' study he graduated M.B., C.M. in 1891, and in 1892 obtained the degree of Bachelor of Science in Public Health. He was for a time assistant physician to the Chester and District Skin Dispensary; he then took up general practice in Shrewsbury, retiring two years ago to Pentrefelin. In Shrewsbury he held several public appointments, being medical referee for some important local institutions, and honorary surgeon and lecturer to the St. John Ambulance Brigade. He was a Fellow of the Royal Institute of Public Health and a president of the Shropshire and Mid-Wales Branch of the British Medical Association.

Modern Technique in Treatment.

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CVII.—THE TREATMENT OF GINGIVITIS.

THE word gingivitis implies inflammation of the gingivæ or soft tissues in the immediate vicinity of the teeth, and should not in any way be confused with chronic general periodontitis, more colloquially known as pyorrhœa alveolaris, the latter being a disease of the periodontal membrane, the delicate structure which closely surrounds the tooth root, and is therefore a deeper seated disease. Cases of chronic general periodontitis may be met with where there is no inflammation of the gingivæ; this may be explained by the fact that the inflammation of the periodontal membrane is situated at the apex of the root. More often, however, it is the gingivitis which draws attention to the other condition. Gingivitis may be divided up into (1) marginal, (2) general, (3) chronic, and (4) ulcerative.

Marginal Gingivitis.

Marginal gingivitis is usually catarrhal in character and may be found both in children and adults. The free margins of the gums appear red, congested, and swollen. The patient may or may not complain of soreness, the gums tend to bleed when touched, and if squeezed a thick muco-purulent discharge often exudes from around the necks of the teeth.

The normal gingival trough is accentuated forming a pocket; this pocket is caused by the swelling of mucous membrane and not through loss of tissue as in the case of periodontal disease. This may be demonstrated by gently investigating the pocket with a probe, when the pocket will be found to end at the neck of the tooth. A careful examination will show that the free margin of the gums have advanced towards the biting edge of the tooth covering part of the crown. The condition may become purulent, and not infrequently the interdental papillæ become hypertrophied and the whole gum swollen, the chronic hypertrophic gingivitis more often found in children.

One of the chief causes of gingivitis is mouth-breathing. Constant friction of the cheeks against the teeth, efficient mastication of food, and above all a constant flow of saliva washing away debris are necessary to bring about the physiological conditions. Mastication will aid in inducing a normal blood-supply to the teeth, but the presence of functionless or tender teeth in the mouth not only provides infected foci, but impedes normal functions. Mouth-breathing allows any particles of food remaining around the front teeth to dry and putrefy, and there is no cleansing action by saliva. Apart from the need to wash away bacteria the gingival organ secretes actually substances which, if allowed to dry, form calcareous rough deposits injurious to soft tissues. In a mouth-breather the gingivitis is generally limited to the anterior teeth.

Other mechanical causes may be traced to over-hanging edges of fillings, but these tend to cause a chronic hypertrophic condition locally. Continued and indiscriminate use of floss silk may cause damage to mucous membrane if forced between the teeth in such a way as to cut the gums, but perhaps the most dangerous is the tooth-pick. This is seldom kept even socially clean, and is often stabbed into the gum in a vain endeavour to remove food lodged between two teeth, and then replaced in the waistcoat pocket.

General Gingivitis.

General gingivitis is commonly found as a sequela of fevers, also in wasting diseases. This may be largely attributed to loss of tone of muscles of mastication following on a liquid diet. The sticky, starchy, and sugary foods, popular in convalescence, unless thoroughly acted upon by ptyaline, form somewhat insoluble substances which stick to the teeth and

putrefy. The ætiology of the gingivitis of pregnancy appears to be somewhat obscure.

Metallic poisons, particularly lead and mercury, lead to general gingivitis which, if not treated, may become serious. Care must be taken to differentiate between a true lead poisoning and other conditions such as tartar or black pigmentation seen in dark-skinned races. A true lead poisoning will usually be characterised by general conditions such as colic or wrist-drop, and the blue line situated on the gum around the lower incisors. Patients undergoing a course of mercury treatment frequently develop a severe gingivitis, and the teeth should be put into a healthy condition before such a course is begun, since in an unhealthy mouth mercury is deposited in minute globules at the gingivæ where they become turned into the sulphide, which acts as a powerful cell poison.

Chronic Gingivitis.

Chronic gingivitis is nearly always due to some mechanical irritation, such as the wearing of a denture at night, and lack of hygiene. In some cases diet may be a factor, such as hot sauces; one case that came under observation appeared to be caused by a sour-milk diet.

The Routine to be Followed by Patients.

In all cases of marginal, general, or chronic gingivitis the cause should be looked for and removed. Where there is mouth-breathing, then any post-nasal growth should receive attention, but in order to break the habit of mouth-breathing, which may persist although there is no nasal obstruction, the patient should wear an oral screen at night. This screen consists of a piece of vulcanite or metal made to fit against the labial aspect of the gums as far back on either side as possible. Thus the screen will be held in position by the pressure of the lips in front, and owing to the shape of the sulci there will be little possibility of much movement or any tendency to swallow it, apart from the fact that the screen is of some size. After a week the patient becomes used to the appliance and will sleep comfortably. In all cases the gums will require an astringent mouth-wash, and the following will be found useful:—

℞ Zinci chloridi .. .. .. } aa gr. ii.
Zinci sulphatis .. .. .. }
Spiritus chloroformi .. .. ℥v.
Aqua menth. pip. .. .. ad ℥ss.
Misce.

Ten drops in half a tumbler of water as a mouth-wash. All tartar should be removed before using such a mouth-wash.

Where there are tags of gum between the teeth an application of pure trichlor-acetic acid may be found useful, administered for not longer than 30 seconds, to be repeated if necessary in a week's time. It is best applied to the tag of gum on a small pledget of wool. An excellent routine for the patient to carry out daily would be somewhat as follows. In the morning two or three drops of some cleansing preparation, as milton, should be placed on the tooth-brush and all the teeth should be carefully cleaned and the mouth then rinsed with the zinc astringent mouth-wash. Next, the gums should be massaged by pinching the gums with the finger and thumb towards the crowns of the teeth, and finally rubbing laterally with the index-finger. During the day the mouth should be rinsed out with the zinc mouth-wash two or three times. At bed-time some non-gritty tooth-paste may be used in preference to the milton, and this should be followed by careful massage with the fingers, using glycerine and tannic acid B.P. preparation. Some people, however, do not tolerate tannic acid for more than a week, in which case some bland preparation as myrrh and borax is substituted, followed by a rinse of water as cold as the patient can stand. It is of importance for the patient to have a small tooth-brush and one which is fairly stiff; if the bristles show a tendency to come out it should be discarded. After use the brush should be rinsed and placed in a suitable position to dry. In the case of hypertrophic gingivitis the application of ferro-pyrin on wool to the pockets once a day will be helpful, this drug being a powerful astringent and anodyne. The treatment of gingivitis by electrical means is a specialised subject and should be carried out only by experts. Gingivitis caused by wearing a denture at night will clear up when the habit is discontinued and with constant mouth-wash. Poisoning from mercury and lead is not difficult to deal with once the poison is discontinued. Hydrogen peroxide may be used with great success in the case of mercury, but if the gums have started to ulcerate then the condition may be dealt with as though it was ulcerative gingivitis.

Ulcerative Gingivitis.

A condition prevalent during the late war was known as "trench-mouth." Of this condition two varieties are described: a diphtheroid type, which is superficial and somewhat less severe than the second type, which is ulcero-membranous and may involve the whole of the buccal mucous membrane and penetrate to the bone. In both types the *Bacillus fusiformis* of Vincent's angina is found besides the pyogenic bacteria always associated with such ulcerative conditions. The appearance of both forms is typical. Ulceration usually commences around a septic tooth or badly fitting crown. Within 48 hours the infection spreads to both jaws and the gums become swollen with grey slough around the teeth. If the infection is of great virulence the teeth become loose. The breath is very foul and the temperature may rise to 102° F. The infection may spread to the tonsils and pharynx. Unless dealt with, the teeth may be lost, and serious scarring take place from the cheeks becoming attached to the gums.

In treating such a condition it is most unwise to extract teeth; this procedure will only allow the condition to penetrate deeper. No great harm will be done by leaving in infected teeth until the condition is improved, unless, of course, an abscess is present. The patient should have a purge followed by saline each morning for four days, and his general health maintained by tonics containing iron and arsenic. Locally, the mouth should be cleaned up by constant rinsing with a chlorine preparation such as eusol, milton, or fecto, about a teaspoonful to a glassful of water. The ulcerated part should be swabbed over with the following preparation:—

℞ Liq. arsenicalis .. .. .. } aa ℥iii.
Vin. ipecacuanhæ .. .. }
Glycerine .. .. .. ℥ii.
Misce.

The patient may suck not more than six 5-gr. tablets of potassium chlorate a day. In a week the patient should be nearly recovered, and the treatment for simple gingivitis may be carried out, but the gums should not be massaged until the mucous membrane has fully recovered. All vessels, especially drinking glasses, should be carefully boiled as the disease is easily communicable.

The best method of applying drugs to the buccal mucous membrane is by the use of wooden applicators bound with cotton-wool such as are employed in aural surgery; these should be burnt after use.

J. L. DUDLEY BUXTON, L.M.S.S.A., L.D.S.,
Dental Surgeon to University College Hospital
Dental Dept.; Assistant Dental Surgeon,
West London Hospital.

NATIONAL HOSPITAL FOR THE PARALYSED AND EPILEPTIC.—A post-graduate course will be held at the hospital, Queen-square, Bloomsbury, W.C., from Feb. 2nd to March 27th. The course will consist of the following subjects: Out-patient Clinics, Clinical Lectures and Demonstrations, Lectures on the Anatomy and Physiology of the Nervous System (if sufficient applicants), Lectures on the Pathology of the Nervous System, Clinical Demonstrations on Methods of Examination (if sufficient applicants), and Lectures and Demonstrations on the Neurology of the Eye. Copies of the syllabus may be obtained on application to the Dean of the Medical School.

Special Articles.

PROCEEDINGS OF THE ROYAL COMMISSION ON NATIONAL HEALTH INSURANCE.

INTRODUCTORY NOTE.

THE Royal Commission on National Health Insurance, under the chairmanship of Lord Lawrence of Kingsgate, has held 14 sittings and is now sitting weekly. The evidence given at the first six meetings by the official witnesses of the Ministry of Health and the Scottish Board of Health supplements and elaborates the printed volume of statements put in by the Government departments in question. This official evidence, taken in conjunction with the statements referred to, embraces a review of the whole of the working of the National Health Insurance system.

We propose to give a résumé of those parts of the official evidence which we consider to be of interest to our readers. Taken as a whole, this evidence gives in a concise and comprehensive form an account of the scheme in which medical men play so important a part, and of which—especially in its more general, as distinct from its medical features—they are, we believe, not too well informed.

This summary of the earlier evidence, followed by a short account of the evidence at more recent meetings given by approved societies, will prepare our readers' minds for the evidence to be given in April on behalf of the insurance practitioners (on the lines of the statement given in our issue of Jan. 10th, p. 95) which we hope to summarise from week to week as the official reports are issued. It is important to note the scope of the official evidence given at this stage. At the outset the Chairman indicated that it was not proposed to invite, for the time being, from the Ministry's representatives, any criticisms of the scheme or proposals for its amendment. It was desired to get a clear view of the system as it is and later to hear the officers of the department on points of criticism and suggestions for amendment.

References to the official statement which has been issued as an appendix in four sections are given thus: Section A, para. 69, is shown as "App. A. 69," and references to the oral evidence thus—Q. 1369.

THE SCOPE OF THE INSURANCE SCHEME.

Who are Insurable?

(App. A. 22–3.) The great majority of employed persons between the ages of 16 and 70 are compulsorily insured, the usual test being whether there is a contract of service. Seamen are included under a special provision, and certain classes of persons are also specially included, who may not be technically under a contract of service, but who are, broadly speaking, in the position of employees working for a master.

Excepted Employments.

(App. A. 4 and 5.) Clerical and other non-manual workers employed at a rate of remuneration exceeding £250 a year are excluded and also many specified employments which are either not the worker's principal means of livelihood, or are employments in which the worker is protected by the terms of his engagement against risks which the insurance scheme is intended to meet. As regards the latter class, no provision need be made by the employer corresponding to medical benefit or any other benefits except sickness and disablement benefit, but the scales of sick pay and pension are frequently so far in excess of the statutory sickness and disablement benefits that the employees are probably not at any serious disadvantage in this respect. Broadly speaking the effect of this provision is to exclude from the insurance scheme all established civil servants and certain analogous grades of Crown employees, the police throughout the country, the majority of Poor-law and asylum officers, the permanent clerical staffs (and in some cases workmen) of many local authorities, and clerks and permanent officials of railway companies.

The Wages Limit.

(App. A. 12.) The wages or salary limit which, it will be noted, is not a limit of total income and does not apply at all to manual workers—was raised from £160 to £250 in 1919. This amendment was merely designed to adjust the remuneration limit to changed economic conditions, and although no precise statistics are available it is probable that the number of insurable persons was not greatly enlarged thereby. The following questions to Sir Walter Kinnear, the Controller of Insurance, as affecting this class, are of interest:—

(Q. 107.) I notice in such bodies as Stock Exchange clerks, insurance officials, warehousemen, travellers, and people of that class, there seems to be an enormous exit from insurance when people get round about 23 to 25 years of age. Do you think that is to be attributed to people going over the income limit?—I can assign no other cause, unless it may happen that their terms are so altered that they pass away from a contract of service.

And again:—

(Q. 110, 111.) Is it not rather difficult to defend an arrangement under which so large a number of young people are compulsorily brought into insurance and compulsorily ejected from it after a few years?—They have the right to remain in insurance as voluntary contributors at the same premium.—Do they ever avail themselves of that right?—Very few do.

Asked whether at the moment he knew of any convenient way of determining whether a person should be insured otherwise than by the present automatic system, the Controller said that he did not.

Doubtful Questions of Insurability.

(App. A. 16.) The Minister is charged with the judicial function of determining, subject to an appeal to the High Court on a question of law, whether a class of employment or the employment of a particular person is within the scope of compulsory insurance and, if so, who is the employer.

As to difficulties in connexion with the manual labour test, the witness said:—

(Q. 35.) We had quite considerable difficulty in the early days, but as a result of experience and legal decisions certain broad determining principles have been laid down and we find our decisions, as a rule, are accepted without question and we have very little difficulty now in this connexion.

(Q. 148, 149.) As a reason for the exclusion of the non-manual worker at £250 when the benefits of the Act are conferred on the manual worker with wages up to any figure, the witness suggested that the former was more accustomed to making provision for himself and had, on the average, greater security of tenure in his employment.

Exempt Persons.

(App. A. 21.) Exempt persons are to be distinguished from excepted persons, who are outside the Act altogether. The exempt person is one who is engaged in employment within the meaning of the Acts, but has voluntarily obtained a certificate exempting him from paying any contribution on the ground that he has a private income or is ordinarily dependent on some other person. The employer in this case remains liable to pay his own share of the contributions, since if he were free from contributing for exempt persons there might be a tendency to give employment to them in preference to other workers. The number of exempt persons is very small, amounting in England to 33,600, or about ¼ per cent. of the population. The employers' contributions are used to provide them with medical benefit, and it appears that 90 per cent. of exempt persons take the trouble to go through considerable formalities in order to get medical benefit.

(Q. 166.) The exempt person is the only person who gets something for nothing?—As far as his proportion of the contribution is concerned, that is so.

Voluntary Contributors.

(Q. 42.) It was thought at the inception of the Act of 1911 that there would be a large number of voluntary contributors, but these expectations were not realised. The scheme for the admission of such persons to insurance was considerably restricted in 1918, and there are now in England only about 30,000 voluntary contributors. They are mainly composed of persons who have been insured as employed contributors for not less than two years and have elected to remain on as voluntary contributors.

Number of Insured Persons.

(App. A. 27.) The number of insured persons in England and Wales was 11½ millions in 1912 and 13½ millions in 1922. (Including Scotland, the total is about 15 millions. Notes on the Scottish evidence will be given later.) Compared with the Census figures of 1911—the last which are available for this purpose—the following particulars are of interest:—

The number of occupied persons in England and Wales at that date between the ages of 16 and 75 (? 70) was 15,200,000. Of these 1½ million are employers or persons working on their account; 270,000 are made up of officers in the Army and Navy, ministers of religion, professional men, &c. This leaves a total of nearly 13½ millions who may be said to be employed in the broad sense of the term, of whom, as stated above, 11½ millions were insured in 1912. The balance of two millions is accounted for by persons whose work does not come within the definition of contract of service or apprenticeship and by non-manual workers over the salary limit and other persons engaged in excepted employments.

Collection of Contributions.

(App. A. 28, 29.) The Health Insurance scheme is contributory in character. The funds are contributed by insured persons, their employers, and the State; the contributions of insured persons and their employers consist in the main of weekly payments, and those of the State take the form of a grant of two-ninths of the sums expended on benefits and their administration. The weekly contribution in general in the case of employed contributors is 10*d.* (9*d.* for females), of which 5*d.* is normally payable by the employer and the remainder by the worker. (App. A. 31–8.) The employer is responsible for paying the joint contribution and may recover the worker's share by deducting it from his wages. During unemployment or sickness no contributions need be paid. They may be paid by the worker during unemployment to avoid a reduction in the cash benefits. No arrears accrue during notified sickness.

The Stamping of Contribution Cards.

(App. A. 38.) Contributions are usually paid by means of stamps affixed by the employer to cards which the worker gives up half-yearly to his society. It is the duty of the worker to obtain a half-yearly card from his approved society or from a post office, and to produce it to his employer on commencing employment and at other times when required by the employer. But, as the onus of paying contributions is on the employer, emergency cards providing for a single weekly stamp are available at post offices for use by employers whose employees fail to produce cards, and it is the duty of the employer to obtain and stamp these cards where the ordinary cards are not forthcoming.

Enforcement of Payment of Contributions.—Inspection and Prosecution.

(App. A. 40.) The payment of contributions is enforced by the Ministry by means of inspection, correspondence, and, where necessary, prosecution. An inspector appointed by the Minister has power to enter at all reasonable times any place (except a private dwelling-house which is not a workshop), to require the production of cards, &c., and to satisfy himself generally that the Acts are being complied with. Routine visits are made to factories, shops, farms, &c., but private employers are in general visited only on receipt of a complaint, although the inspector has no right of entry in such a case and must withdraw if requested to do so. Proceedings generally must be brought within one year after the offence. During the year 1923 the number of prosecutions in England was 984.

(Q. 24.) Asked whether there was any evidence of hostility to the scheme on the part of employers or employees, the Controller said that there was a good deal of hostility in the early days, partly owing, he thought, to political considerations, but that it had died down. Of course, he said, we get complaints from time to time from individuals. That is inseparable from the working of a scheme which affects 15,000,000 bread-winners and practically every employer throughout the country. But, he said, there is no evidence of general hostility to the Act now. As to evasion of the payment of contributions, Sir Walter Kinnear said:—

(Q. 213.) Our calculations lead us to think that on the whole we collect about 99 per cent. of the contributions which are due. We recognise that there is a certain degree of non-compliance amongst casually employed persons, and to a more limited extent amongst domestic servants.

Special Classes of Workers.

Interesting provisions will be found in the evidence as to problems affecting special classes of workers, of which one or two short notes here will give a sufficient indication. (App. A. 55.) In the case of out-workers, for instance, who work at home for several employers, a special system of "units" of earnings (equivalent to a full week's earnings if working for one employer) has had to be devised, under which each employer stamps a card for each unit instead of for each week without regard to the question whether another contribution has already been paid in the same week by another employer.

(App. A. 48–54.) Again, special provisions for the contributions and benefits of seamen in the mercantile marine are necessary. There is a reduced contribution in the case of foreign-going ships, in view of the fact that the employers are liable under the Merchant Shipping Acts to provide the seaman with medical treatment and maintenance during sickness until they return him to a home port. As regards foreign domiciled seamen, employers' contributions are paid quarterly to the Ministry, and the amount collected, which is approximately £23,000 a year, at the present time, is credited to a special fund, commonly known as the Lascar Fund, and is used for the provision of pensions for insured seamen under a scheme administered by a governing body comprising representatives of shipowners and insured persons.

The Controller's evidence on the subject of cash benefits and medical certification will be summarised later, after some of the main official evidence with regard to medical benefit has been given.

THE fourteenth meeting of the Commission was held at the Home Office, Whitehall, on Jan. 22nd, Lord Lawrence of Kingsgate in the chair. Evidence was received from three miners' societies—viz., the Scottish Miners' Federation Approved Society (Mr. James Gold), the Lancashire and Cheshire Miners' Permanent Approved Society (Mr. D. Shaw), and the Lancashire and Cheshire Miners' Federation Approved Society (Mr. Lee Shaw). The special difficulties arising in societies composed wholly or largely of miners were represented by these witnesses—in particular the inability to give additional benefits owing to the unavoidable heavy expenditure on normal benefits for those engaged in the mining industry. Proof copies of oral evidence given at the meeting, Jan. 8th, are now on sale at H.M. Stationery Office (1*s.* 6*d.*).

SOME REFLECTIONS ON SECOND-HAND CARS:

WITH HINTS ON THEIR PURCHASE.

BY J. MARSHALL, M.I.A.E.,

LONDON MANAGER OF MESSRS. MANN, EGERTON AND CO., LTD.; OFFICIAL CONSULTING ENGINEERS, MEDICAL INSURANCE AGENCY.

THE second-hand car problem, both from the owner's and the motor-car dealer's point of view, is too often a source of tribulation and of hard thoughts. The owner naturally seeks to obtain the fullest market value he can for his property and the dealer to ascertain the lowest price at which he can get the car. This question is probably one of the most difficult the dealer has to face. The average owner is disposed to consider the value of his used car at far in excess of its actual worth on the market, and where the medical man appears especially inclined to go wrong is in respect to purchases made in the two years following the war period. During this time enormous prices, and in many cases large premiums, were obtained, with the result that values became quite fictitious. When the unfortunate owner of a car bought during 1919 and 1920 proposes to sell it he is horrified at being offered a mere fraction of the purchase money, forgetting to what extent values have decreased during the intervening years.

The particular value of each second-hand car is, apart from its condition, based on the present-day prices of a new car of similar make. The owner when considering the exchange of his used car for a new one is often inclined, without much consideration, to accept the highest offer made for the used car. This is not necessarily a wise decision. The owner should ask himself the following questions: (1) Am I getting good value in the price being paid for the new car? (2) Am I buying a car which is not a good seller? (3) Has the car being offered to me a good second-hand value?

If the car is not good value for the money asked, it can be assumed that the owner will be offered a high price for his used car. If it is not a good seller, any small increase in the value allowed for the second-hand car will not anything like cover the heavy depreciation which will occur immediately the car is put on the road. It may be that a car sells freely but has a low second-hand value. Thus it happens that many fairly high-priced cars will be found to be cheapest in the long run, largely owing to their low depreciation—i.e., high second-hand value. My experience is that too little attention is paid to these points by would-be purchasers, many being inclined to consider only the low initial cost.

The Purchase of a Used Car.

The purchase of a used car bristles with difficulties. Here especially does it pay a purchaser to deal with a firm which is careful of its reputation in the sale of used vehicles. Such a firm gives no guarantee with a used car, but studies the interests of clients by careful examinations and submits a candid opinion as to the car's mechanical condition and worth. From a reliable firm a first-rate used car should be obtainable if the owner is prepared to pay a fairly good price. It is rarely possible, although it does happen, at long intervals, that a first-class car can be bought at a "give away" figure.

The "Points" of a Used Car.

The Trial Run.—When the purchaser has clearly in his mind the type of body required, and has decided that the h.p., age, and finally the price, which is practically governed by the last two points, are, broadly speaking, satisfactory, a run on the road should be taken. The trial should, if possible, include a steep and a long hill so that some idea as to the power, road performance, and general silence of the car may be obtained. These being satisfactory, the following vital points should be carefully examined.

(*a*) *Engine.*—Without going into technical details, some idea of the condition of the engine can be arrived at by listening when it is running idle, and also under load. If any knocking is heard the opinion of an expert should be obtained, for it may prove vastly expensive to get rid of knocking. It may, and often does, involve the renewal or extensive repair of loose gudgeon-pins, slack pistons, broken rings, broken big-end connecting-rod bushes, and sloppy main bearings. Knocks are very elusive and difficult to locate definitely, although, broadly speaking, where there is a distinct thump it may be taken that the bearings on either end of the connecting rod are badly worn. Where this occurs the engine has to be taken out and this procedure may cost, over and above the cost of any broken parts replaced, anything up to £15.

(*b*) *Steering Connexions.*—Front wheels should be examined for play in bearings and swivel-pins. The amount of play can be decided by jacking up the wheel and jerking the wheel itself sharply in and out and sideways. There should be practically no movement either way.

(*c*) *The Gear-box* should be examined for worn bearings and worn teeth on gear wheels. This is quite simply done, as the ordinary gear-box cover is removable with the undoing of two or three wing nuts. To test for wear in the bushes, jerk the shafts sharply up and down, when there should be no movement. Excessive wear of the gear-wheel teeth is shown by a flat on the teeth about one-third of the way down. When this is found it does not follow that the gears are not sound; generally the effect of worn teeth is a noisy gear-box, especially in the lower gears.

(*d*) *Universal Joints.*—Usually these are made of fabric and the holes in the joints may be found to have practically worn through or the material itself to be badly twisted, causing the propeller shaft to run out of truth, with consequent noisy transmission. The effect of a propeller running out of truth is to upset the balance of the whole car, causing the gear-box and back axle to be noisy, in addition to which there is intense vibration throughout. The cost of replacement of the worn fabric joints would be roughly 30*s.* each or, if of the metal type, approximately £6. The metal type is not often found on up-to-date cars, since the fabric type is much easier to replace and requires no attention under running conditions.

(*e*) *Back Axle.*—If both wheels are jacked off the ground the end-play of the differential can be tested by pressing each wheel in turn in and out and noting the movement; end-play should be slight. If, when the car was tried on the road, the back axle was found to be noisy it would require careful examination, particularly as to end-play in the bevel pinion.

The Lighting and Starting System is a vital part of the car and is probably the most expensive part. Great care and attention should be given to the inspection of the various units. The battery should not be forgotten; its condition can easily be determined even by a superficial glance at the plates and terminals. A glance at the plates will show whether they are sulphated or not, that is, whether covered with a grey-green deposit. When the plates are in this condition, which is obvious even to the tyro, it is a sign either that the battery is worn out or that it requires new plates, an expensive process which would probably cost about £4–£5. Whilst on a trial run, the opportunity should be taken to see whether the dynamo is charging at slow engine speeds, such as 15 miles an hour on top gear, since the doctor's rounds often involve a good deal of low-speed driving. When the engine is speeded up to a road speed of 25 miles per hour on top gear with all lights on, the current taken out should be only slightly more than that going in, this consumption being shown on the meter on the dashboard. In view of the fact that the lighting and starting system

of a doctor's car is used extensively it is essential that the battery be of large capacity. Much depends on the size of the engine, but for an ordinary car of, say, 12 h.p., the battery should be of a capacity of about 80 ampère hours; otherwise it will constantly be found necessary to have it charged on the board.

Body Work.—It is not difficult to estimate the condition of the body as to paint-work and upholstery, but not so easy for the average purchaser to say whether it is a good, bad, or indifferent one. New bodies vary in price as much as 100 per cent., type for type—that is to say, some first-class coach-builders can obtain double the price for their products that a second-class firm could safely demand. A good body will always have its value. It looks well, paint-work is good, and rattles and squeaks are absent. These factors have a great influence on the worth of a second-hand vehicle, particularly where closed bodies are involved.

Conclusion.

For no apparent reason certain makes of cars have in certain years not proved very satisfactory in the hands of the public, even as certain vintages find no favour. Caution should be exercised in the purchase of vehicles which may have been used during the war period. There was nothing inherently wrong with those made at that time, but many of them were subjected to the roughest possible usage by bad drivers and under appalling conditions, and unless they had had a considerable sum of money spent on them they would be practically worn out in spite of being painted up nicely and looking smart.

It is difficult to give a general idea of the amount of wear that should be disregarded in testing second-hand cars for faults, nor is it easy to give the cost of repairs to make good defective or worn parts. The cost of a particular part might be 6*d*., but labour charges for fitting same might quite easily mount up to £10 according to the make of the car. The works of some cars, especially certain continental makes, are notoriously difficult to get at, and very often involves the taking down of an engine, gear-box, and clutch to replace a small part, in, for example, the clutch itself.

In conclusion, I can only emphasise again the fact that the prospective owner would be well advised to obtain the services of an expert before finally completing a deal. The small sum involved in an inspection fee may save him a very large sum in the long run.

INFECTIOUS DISEASES ABROAD.

THE following general summary is compiled from the monthly epidemiological reports published by the Health Section of the League of Nations, supplemented, when possible, by more recent information from other sources.

Plague.—A new outbreak of plague is reported from the Canary Islands, the affected localities being Santa Cruz and Realego Alto, both in the island of Teneriffe. These localities, as well as Las Palmas, Puerto Luz, and Orotava in the island of Gran Canaria, were also affected last year and in 1923, but little or no clinical or epidemiological information about the cases is available. In the Azores, cases continue to occur in the neighbourhood of Ponta Delgada in the island of St. Michael; of 20 cases reported up to Dec. 26th, nine were fatal. The apparent cessation of the epidemic at Lagos (Nigeria), reported in a previous summary,[1] lasted until the end of 1924, but six fresh cases occurred during the first 12 days of the present year, and the official declaration of freedom from the disease has been withdrawn. The outbreak at Los Angeles (California) is definitely at an end, but during the extensive search for infected rodents, which is being carried on continuously there and elsewhere in California, as well as in other suspected areas in the United States, 63 infected rats were found at Los Angeles up to Jan. 3rd of this year, eight at Oakland between Dec. 13th and Jan. 3rd, and five at New Orleans up to Jan. 3rd. In South Africa cases of bubonic plague occurring singly or in twos and threes continue to be reported from rural districts of the Transvaal, the Cape Province, and the Orange Free State.

Cholera.—Excepting India, where, at present, cholera is somewhat more prevalent than during the same period of last year, very few cases of this disease have recently been reported from any part of the world.

Typhus.—No definite increase in the incidence of typhus is shown in the statistics recently received from countries of Eastern Europe. The latest information from Poland indicates that the prevalence of the disease in that country is steadily decreasing; the incidence at present in Latvia and Lithuania is also low in comparison with the incidence during the same period last year.

Small-pox.—The outbreak which occurred in Bosnia-Herzegovina in November, 1924, lasted only two weeks, during which 66 cases were reported. Most countries of Europe are at present unusually free from the disease. In Switzerland only two cases were notified during the first week of the present year.

Enteric Fever.—In nearly every country in the Continent of Europe, as well as in England and Wales,[2] a considerable increase in the recorded incidence of enteric fever was a notable feature of the statistics of disease during 1924 as compared with those of 1923. It may be that the increase can be partially explained by improved notification, but in general it was so considerable and widespread that a true increase of prevalence must be presumed. The increase was most marked in the Baltic region, particularly in Sweden, Finland, Esthonia, Latvia, and Lithuania, in each of which the number of cases recorded during 1924 was much higher than in either of the two preceding years. In Finland 499 cases were notified during October as compared with 280 in the same month of 1923, and 157 in the same month of 1922. From Russia recent statistics are not available except for the city of Leningrad, where 175 cases with 16 deaths were notified during the fortnight ended Nov. 1st, as against 98 cases with 12 deaths during the preceding fortnight. Germany, Poland, Bulgaria, and the Kingdom of the Serbs, Croats, and Slovenes are other European countries with an unusually high incidence of enteric fever during 1924. In Germany the weekly notifications began to decline after the middle of September, but in Poland the maximum had not been reached at the end of October.

Scarlet Fever and Diphtheria.—During the second half of 1924 there was a serious increase of scarlet fever in many areas of Russia, particularly in the chief cities. In Leningrad between the middle of July and Nov. 1st there were 1677 cases, of which 628 occurred during the last four weeks of the period. In Moscow, Kiev, and Odessa the incidence in September was twice as high as in August. Regions as widely separated as Gomel in White Russia, Velikij Usting in the north, Rostov on the Don, and Petrozavodsk near the Baikal Sea were affected, and it is said that the fatality-rate was high, and that severe cases amongst adults were frequent. In Scandinavia, Poland, the Netherlands and Germany scarlet fever was more prevalent during the last quarter of 1924 than during the same period of 1923, but in Jugo-Slavia and Bulgaria the incidence of the disease was relatively low. In most European countries the incidence of diphtheria at present is not higher than is usual at this season of the year.

[1] THE LANCET, Jan. 3rd, 1925, p. 43.

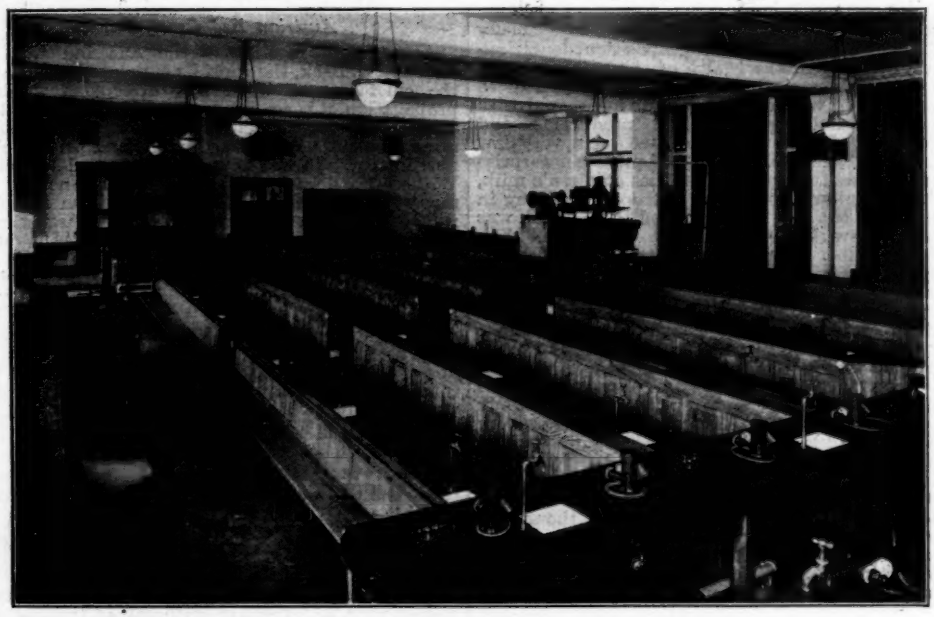
[2] In England and Wales approximately 4072 cases were notified during 1924 as compared with 3211 during 1923.

PATHOLOGY AND BACTERIOLOGY AT ST. BARTHOLOMEW'S MEDICAL COLLEGE.

NEW LABORATORY ACCOMMODATION.

THE teaching of pathology and bacteriology at St. Bartholomew's Medical College has recently been reorganised under the direction of Sir Frederick Andrewes. It now extends over two and a half years of the clinical curriculum, in order that the student may correlate his study of the science of disease processes with his practical observations in the wards. The transference last year of the department of physiology of the Medical College to its new building in Giltspur-street was timely, for it left vacant a laboratory adjoining the pathological block which has been recently adapted for the teaching of morbid anatomy and histology to large numbers of students. The enlargement was effected by the removal of the partitions which separated the private room of the professor of physiology from the main laboratory. The new room measures 63½ ft. by 36 ft., giving accommodation for 98 students doing practical work, allowing 3 feet for each, whereas for lectures, owing to the addition of seats in front of the first rows of benches, 200 men can be seated. A microscope lamp and a gas point are provided for each student, and one sink for every two students. The microscope lamps are made cheaply from inverted treacle-tins painted black outside and aluminium inside. The lids are screwed to wooden bases, and a hooded opening is made at one side of the tin. Each student has a locker under the bench behind him, so that he merely has to turn round to get at it. Lockers for men in the back rows are placed in nests on the walls. The benches are raised in tiers, each 5 inches above the one in front; the side benches are also raised. All the bench tops are teak, the rest of the wood being pine. Two demonstration benches, each 15 feet long, are placed one on each side of the lecturer's bench. An epidiascope stands opposite the lecturer's bench on a platform level with the back benches. Made by Zeiss, it is a combination of two of the latest models. It has a 30 ampère arc for episcopic projection, and by means of a revolving front will also show museum bottles on the screen, which is on the wall behind the lecturer's bench. Above the episcopic projecting apparatus is an optical bench on which a 5 ampère arc projects a direct beam either through a microscope or lantern slide. The lower power of this lamp makes it possible to leave slides on the screen for any length of time undamaged by heat. Sections or films can be successfully shown even under a 1/12 lens at a distance of 22 feet from microscope to screen.

Both in general plan and in detailed equipment this laboratory gives evidence of the most careful study of the needs of the student. While no expense has been spared in such structural alterations as the raising of the benches in tiers so that every student can see the lecturer, economy has been considered in so far that wherever possible the fittings and bench tops of the old laboratory have been adapted and fitted in the new one. The result is a very fine laboratory, light and spacious.



THE RECONSTRUCTED PATHOLOGICAL LABORATORY AT ST. BART.'S.

PRESENTATION TO PROF. MATTHEW HAY.—The town and University of Aberdeen recently combined to honour one who has rendered signal service to both. On Jan. 14th Prof. Matthew Hay was presented with his portrait in oils by Mr. Charles Sims, R.A., Keeper of the Royal Academy. Principal Sir George Adam Smith on behalf of the University, and Lord Provost Meff on behalf of the town paid warm tribute to the work of Prof. Hay, who occupied the chair of forensic medicine in the University since 1883, and who was medical officer of health for the city from 1888 to 1923. Some indication of Prof. Hay's untiring industry may be gained by recalling that, apart from these offices, he was an original member of the Medical Research Council, and represented the University on the General Medical Council, the Carnegie Trust, and the Federated Superannuation Fund. For 25 years he was chairman of the University's finance committee.

VIENNA.

(FROM OUR OWN CORRESPONDENT.)

The Quality of the Vienna Milk-supply.

AT a recent extraordinary meeting of the Vienna Pædiatric Society the problem of the supply of children's milk for the Vienna population was discussed by medical men and agriculturists. Prof. Pirquet opened the meeting with a report on the relative value of milk as food, showing that it is the cheapest source of animal albumin. The rearing of milch-cows must be regarded as more economical than the rearing of pigs). One unit of feeding material is turned into two-thirds of a unit of milk, whilst the latter-named animals give only a return of one-third of human food unit. Dr. Reichel showed the present condition of the Vienna milk-supply as regards quality. The data given by him were collected last year by private enterprise to obtain an exact picture of the actual conditions with a view to legislative measures. The following points were those chiefly investigated: Adulteration, decomposition, denaturalisation of milk, and the health of the animals. The result was disappointing. The milk supplied to Vienna children was manifestly poor in fat and with a high bacterial content. The production and manipulation of milk was conducted on a very low standard of cleanliness. Since 1909 private enterprise had endeavoured to secure first-class children's milk, but the public authorities had not done anything in this respect. Mr. Winkler explained that if milk was to have a low bacterial content (not more than 80,000 in a cubic centimetre) and to be free from all pathogenic material, it must be obtained from healthy cows and handled only by healthy and cleanly persons. Dr. Schlossmann emphasised the necessity of sending all milk required for infant consumption through a central control station in the cities, where it can be stored (cold storage) and treated in any way necessary. The price of milk must be in proportion to the costs of production and transport, otherwise the supply drops short of demand. This was demonstrated by Mr. Hainish, the President of the Austrian Republic, one of our largest agriculturists, who also took part in the discussion. He said that before the war 850,000 litres of milk were brought daily to Vienna. When the price was fixed at a low sum by the magistrates the supply fell to 60,000 litres. Our republic has sufficient facilities to enable every inhabitant to get at least one litre of milk per day out of the production of the country without relying on imports.

A Hygiene Exhibition in Vienna.

In early summer an exhibition devoted to hygiene will be held in Vienna. The well-known museum of hygiene in Dresden will coöperate and a most comprehensive exhibition may be expected. A series of dry and wet specimens, objects, models, tables, and statistic and graphic demonstrations will be on view. A special department will deal with modern individual hygiene, the supply of sound and economic food, including various diet formulæ for the normal and diseased body, and vegetarianism; healthy housing, clothing, and physical culture (and scientifically conducted cosmetic culture) will also be demonstrated. Another department will be devoted to the vast subject of social hygiene; antenatal and infant welfare, the care of the chronically diseased tuberculous subjects and cripples, as well as of juveniles and of the senile will receive attention. Sections will be devoted to: modern sport and gymnastics; the prevention of infectious diseases, including venereal diseases; the problems of city buildings, drainage, police, water-supply; control of food; the protection of the manual and brain worker against the dangers involved by their occupation; the training of nursing personnel; the organisation of spas and sanatoriums, of public and private hospitals, to which the State corporations and private institutions will be able to contribute. The intoxicating liquors and habit-forming poisons (alcohol, morphine, cocaine, arsenic) form another section. The problem of recreation—chiefly from the viewpoint of the poorer classes, who cannot afford a regular week-end or a few weeks stay in the country—will receive attention. The Municipality of Vienna deserves credit for providing huge sun-baths, playgrounds, and forest or open-air schools for debilitated children. A series of lectures by eminent physicians will aid the public in obtaining an insight into the modern views of hygiene. In connexion with this exhibition the united organisations of Austrian women will conduct an exhibit, "the new household," devoted to the reorganisation of the antiquated methods of housekeeping and cooking. This will be the first of its kind in Europe. Its aim is to open up the problem as to how all requirements of the family can be satisfied at a minimum expenditure of money, mental and manual exertion and time. The reduction of household work by time- and labour-saving devices and machines will give the housewife much greater opportunities of rest and spells better health.

Austrian Red Cross Society.

At a recent meeting of the Austrian Red Cross Society Mr. Beck, the President, pointed out that now the chief line of work was directed towards the propagation of peace-time enterprise. The problem of sanatoriums for consumptives, of training of qualified nurses, as well as the aid of public and private charitable institutions was now receiving special attention. Without the financial and moral help by the Red Cross many of these institutes would have been completely ruined during the last few years. The large stores of provisions, sanitary appliances, and outfit at the disposal of the Society were used to keep these institutes running. The large tuberculosis hospital in Grimmenstein is conducted solely by the Society, and here hundreds of diseased women and children are restored to health. In the last months of the year 1924 attention has been centred chiefly in the work of social care of young people, and the efforts made to interest the younger classes of the population in this work have met with very satisfactory results.

Jan. 14th.

UNITED STATES OF AMERICA.

(FROM AN OCCASIONAL CORRESPONDENT.)

Outbreaks of Typhoid Fever.

IT is more than ten years since New York City was visited with an explosive outbreak of typhoid fever, such as began in the third week of November last. In the week ending Dec. 13th, 1924, 116 new cases were reported to the health department, and since then a score or so of new cases have appeared daily. Over 400 cases have occurred during the outbreak. Typhoid fever has also been prevalent in the adjoining counties of New York State and in the city of Chicago, where there have been 99 cases with 11 deaths. The source of contamination remains more or less of a mystery. The cases are scattered widely over the area of the city, and yet careful investigation of the water- and milk-supply have failed to discover any loophole for infection. Suspicion has fallen upon some of the oyster beds, since a large proportion of the cases admit having consumed oysters. Although no *B. typhosus* has been found amongst the oysters, and the case against them is at least unproven, the Health Commissioner, Dr. Frank J. Monaghan, has put a ban on the sale and distribution of shell-fish from beds in Hempstead Bay. The special appropriation of $50,000 which the city has made for combating the outbreak represents a mere fraction of what the oyster industry must be losing. An appeal for help has been addressed to the Federal Health Service, which responded promptly. The investigation has been assigned to Dr. L. L. Lumsden, who has already been successful in finding the origin of several typhoid epidemics in different parts of the country. He will be

assisted by several junior officers of the Service, and there is reason to believe that the investigation will prove of first-class importance to the science of epidemiology.

Social Values of Disease.

In a De Lamar lecture at the School of Hygiene, Johns Hopkins University, on Jan. 12th, Dr. Homer Folkes discussed public health in relation to social welfare. He stressed a point of difference between the medical practitioner and the health officer in that the former responds equally to all calls for help, whereas the latter is compelled by circumstance to select a few diseases upon which to concentrate his effort and financial resources. A disease which carries off babies in the first year of life is obviously of less social significance than a disease which slays the young parent of either sex leaving children uncared for or unprovided for according to whether the mother or the father is carried off. From this point of view the age-group 25–35 is, perhaps, the group most to be protected from mortality. From a more strictly economic point of view the group 20–30 is of first importance. The requirements of the American social ideal involve an increasing investment in the citizen during the first 20 years of life, and it is only in the third decade that the returns begin to come in. Besides, the consideration of mortality is that of the degree of recovery in cases which do not terminate in death. Although four diseases—heart disease, cancer, Bright's disease, and pneumonia—have now passed tuberculosis as causes of death at all ages, only pneumonia can compare at all with tuberculosis as a cause of mortality in the third to fourth decades of life. Moreover, we have no means as yet of controlling the mortality from pneumonia. There are two other diseases in still more humble positions in the tables of mortality which are of great social significance. These are mortality in childbirth and syphilis. The first is really a notable cause of death when the deaths are measured against the total population exposed to risk, while the second parades under many disguises, and if all these were collected under a single caption there is no doubt that an important cause of death would be revealed. Besides the social significance of a disease, the practical administrator must also take into account the scientific knowledge at our disposal for combating it, the practicability of applying that knowledge, and the significance of the disease, not only to the present generation but also to posterity.

THE *Journal of Scientific Instruments*, a monthly publication dealing with the principles, construction, and use of their apparatus, is produced by the Institute of Physics with the coöperation of the National Physical Laboratory; the journal has been published hitherto by the Institute, but in future will be issued from the Cambridge University Press on behalf of the Institute.

THE NEW MEAT REGULATIONS.—The Minister of Health has addressed a letter to Lord Banbury and Sir Henry Cautley, who consulted him as to certain prevalent misunderstandings of the Public Health (Meat) Regulations, 1924, and the Rural District Councils (Slaughter-houses) Order, 1924. (See THE LANCET, Jan. 10th, p. 90.) These Regulations, the Minister writes, are designed to give effect to certain of the recommendations of the Departmental Committee on Meat Inspection, and do not impose any limitation as to the persons who may slaughter animals or as to the places at which animals may be slaughtered. What they do require is that where an animal is slaughtered for sale for human consumption notice must be given to the local authority, and the carcass must be retained for a few hours to give the inspector an opportunity of inspecting it if the local authority desire that this should be done. This is a very important provision for preventing traffic in diseased meat, inasmuch as inspection can only be satisfactorily carried out at the time of slaughter when all the organs are available for examination. This provision only applies where the meat is intended for sale, and the requirement as to the retention of a carcass does not apply in the case of a sheep, the danger of disease in sheep being relatively small.

Correspondence.

"Audi alteram partem."

THE SALE OF PATENT MEDICINES.

To the Editor of THE LANCET.

SIR,—The publication of a Special Supplement on the Sale of Patent Medicines by THE LANCET of Jan. 10th has again brought an important subject to the notice of the medical profession. This Supplement, which contains the report of the Select Committee of the House of Commons on Patent Medicines, 1914, and the text of the Proprietary Medicines Bill, 1920, deserves careful perusal by every medical man. While all are aware of the harm which is caused by the indiscriminate sale of patent medicines many are still unaware of the extent of the evil and of the powerlessness of the law to deal effectively with it. Ample information on both of these subjects is supplied by the report. It must be more generally recognised that the present uncontrolled sale of remedies and appliances, which are vaunted for powers they do not possess, leads many unfortunate sufferers to lose valuable time at the onset of serious illness before they seek medical advice and treatment. The analysis of many of these secret remedies has shown that they are useless and cruel frauds sold at an exorbitant price. There is urgent necessity for amendment of the present law. If the Proprietary Medicines Bill, 1920, became law it would go far to remedy the present deplorable state of affairs. It is greatly to be hoped that the present Government may be induced to bring about this very necessary reform so that we may at any rate no longer lag behind our colonies and other countries in a matter so vital to the health of the nation.

I am, Sir, yours faithfully,

Manchester, Jan. 26th, 1925. GEORGE R. MURRAY.

To the Editor of THE LANCET.

SIR,—If the public is concerned about its own interests, it should be deeply grateful to THE LANCET for bringing back to life the report of the Select Committee of the House of Commons on Patent Medicines. I trust that as a result of THE LANCET'S public-spirited action the present representatives of the public at Westminster will be moved to give their earnest attention to the striking statements of this plain-spoken document, and see that legislation upon the urgent questions it raises is not further delayed. That it was shelved during the Great War was perhaps inevitable; that a measure founded on the report got no further than the Upper House during the political turmoil of the last few years was not surprising; but now that we have entered on quieter times and there is no general election in immediate prospect, the House of Commons, one may hope, will have more ample opportunity for undertaking legislation of the kind that is useful rather than showy.

Of the urgent need of legislation on the subject in question I think no one who studies your re-issue of the report can doubt. We find the Committee roundly asserting, in sum, that under cover of a legitimate trade in medicinal preparations the varied resources of advertising were being employed in the promotion of a number of impudent and heartless frauds, involving danger to life and health as well as to purse; that these frauds were being prosecuted by the help of mendacious assertions, bogus testimonials, and fictitious signatures; that highly intoxicating beverages were being puffed and sold as medicines without any indication of their alcoholic contents; that advertisements were issued which were thinly veiled incitements to criminal acts; and that the large sums spent in advertising were sufficient to keep a large section of the press muzzled on the whole subject. Add to this that ours seemed to be about the only civilised country that had made no

serious attempt to check such abuses, and that even the few enactments bearing on this traffic were rendered abortive by the failure of the legislature to provide for carrying them into effect, and the case for the prompt re-introduction of the interrupted Bill of 1920 seems unassailable.

At the present day, fortunately, medicine is not unrepresented in the legislature; and it is to the medical Members of the House of Commons, and to the representatives of the more modern universities, who number so many medical men among their constituents, that appeal may in the first instance be justifiably made.

I am, Sir, yours faithfully,

The Athenæum, Jan. 24th, 1925. ISAMBARD OWEN.

To the Editor of THE LANCET.

SIR,—Your supplement of Jan. 10th will, I am sure, be of more than passing interest to the profession and the public by exposing the menace to the health of the community by the use of proprietary medicines and the fortunes made by the sale of them to an over-credulous public.

The object of this letter is to illustrate the way in which some at least of the pretensions of those who batten on human suffering may be checked by individual effort. About ten years ago there appeared at the end of a number of a well-known monthly magazine of high repute a concealed advertisement having the likeness of an editorial article, occupying two pages—a plausible reference to a cure for consumption, concluding with an address in Australia to which £5 was to be sent for particulars of the remedy. I at once wrote to the editor, calling his attention to the article, urging him to see that this masked advertisement did not appear in future numbers, at the same time pointing out how derogatory it was for a journal of such standing to become party to a fraud. To secure the success of my protest I promised, in the event of the "article" being repeated, to ask my colleagues to remove his magazine from their waiting-room tables. I received a "high and haughty" reply, together with an invitation to wait upon the editor. I then wrote suggesting an interview at *my* house. This concluded the correspondence, but its object was achieved in that no further veiled advertisements appeared.

I am, Sir, yours faithfully,

CHARLES W. CHAPMAN.

Wimpole-street, W., Jan. 13th, 1925.

DRUNK OR SOBER?

To the Editor of THE LANCET.

SIR,—We have read with interest and amusement the address of Sir James Purves-Stewart delivered on Jan. 13th before the Society for the Study of Inebriety. At the same time we must confess to a certain feeling of disappointment; for we had hoped that the harassed divisional surgeon might, perhaps, derive from this lecture valuable assistance in the most thankless and difficult of all his tasks—something a little more helpful, for instance, than a half-hearted instigation to the performance of lumbar or cistern puncture! And there is one point on which we must at once join issue with Sir James Purves-Stewart—namely, his suggestion that "the police surgeon may be too open to suggestion." We venture to submit that the police surgeon is very much less open to the charge of bias than is the medical man called in by the suspect for the express purpose of proving the latter's sobriety. With a long experience of many police divisional surgeons, we have no hesitation in saying that we have implicit confidence in their absolute impartiality. The divisional surgeon has nothing to gain by supporting the provisional diagnosis of the arresting police officer; in point of fact he very frequently reports on his man as being sober, and we are satisfied that when the divisional surgeon has any doubt as to the prisoner's sobriety, the prisoner gets the benefit of the doubt.

We also contend that a police surgeon attached to any of the big stations in central London has an unrivalled experience in the recognition of inebriety in all its stages, and, for ourselves, we would prefer to rely on the opinion of such an experienced and impartial observer rather than on that of any other medical man, however eminent in his own particular line. Again, we do not feel that Sir James Purves-Stewart has sufficiently emphasised the notorious fact that drunkenness may be a very transient phenomenon. We can most of us recall incidents in the course of bump-suppers, or similar festivities, illustrative of this point—e.g., the incoördination and dysarthria of the undergraduate at 10.30 P.M., who has pulled himself together and is conversing amicably, though possibly with a slightly overdone solemnity, with the dean at 11.15 P.M. The same sort of thing occurs not infrequently at the police-station, if we substitute a distinguished consultant for the dean of the bump-supper days.

We are, Sir, yours faithfully,

CHARLES A. BALLANCE.

London, Jan. 26th, 1925. MAURICE CASSIDY.

ETHYLENE GAS.

To the Editor of THE LANCET.

SIR,—Dr. Langton Hewer's article in your issue of Jan. 24th on his investigations as to the value of this anæsthetic are of interest, and all anæsthetists will, I am sure, be grateful to him for publishing them. Undoubtedly with oxygen it is most valuable. Unfortunately there is a fly in the ointment; I exclude the difficulty in compressing the gas, as seemingly Messrs. Coxeter have overcome that; personally the chemist who most kindly attempted to do so for me some 20 months ago was not as successful. The one point which does, however, interfere with the value of this anæsthetic is its explosive nature. Now that electric sterilisers are more popular, this contra-indication to its general employment may not be as powerful. Still, I would emphasise the fact that its use in the neighbourhood of a naked light is fraught with danger.

I am, Sir, yours faithfully,

CHARLES T. W. HIRSCH.

Hyde Park Gate, S.W., Jan. 25th, 1925.

ALASTRIM, PARA-SMALLPOX, AND VARIOLA.

To the Editor of THE LANCET.

SIR,—Prof. Jorge appears to deal with his subject very fully, but I do not think the Gloucester cases of last year fitted altogether with his description. (1) *Age-distribution.* The majority of the cases occurred in children, the greatest incidence being between the ages of 5–15. (2) *Onset.* In every case I have seen there has been a definite prodromal illness of three to four days, frequently severe. (3) *Rash.* Distribution was similar to severe small-pox, and in marked cases there were lesions with umbilication and scarring. In my experience there was, contrary to Prof. Jorge's findings, a definite relationship between local and general conditions. A severe rash was always accompanied by a certain amount of prostration and frequently by secondary fever. I fail to see how it would be possible to differentiate between a well-marked case of so-called alastrim and a mild case of true small-pox.

Material from some of our cases at Brockworth was sent to Dr. M. R. Gordon at the Pathological Department, St. Bartholomew's Hospital. He reported (1) the serological reaction obtained from the material was similar to that from vaccine lymph, and (2) the material he received from a very virulent case in the Surrey area in the autumn of 1923 reacted serologically in the same manner as the Gloucester strain.—I am, Sir, yours faithfully,

RONALD B. BERRY,

Jan. 24th, 1925. Medical Officer of Health, Gloucester.

"ELECTRONIC REACTIONS."

To the Editor of THE LANCET.

SIR,—One sentence of a certain report quoted in the last issue of THE LANCET (p. 180) is very illuminating. The signatories to the report presented to the joint Sections of Medicine and Electro-Therapeutics of the Royal Society of Medicine declare that "the fundamental proposition underlying the original and other forms of apparatus devised for the purpose of eliciting the so-called electronic reactions of Abrams is established to a very high degree of probability." (It should, perhaps, be noted that in the *British Medical Journal*, the word "designed" appears in place of "devised.") But how was this fundamental proposition first arrived at? Surely, nothing could have been *known* about the electronic reactions prior to the construction of the apparatus designed or devised to elicit them? We must therefore conclude that the electronic reactions were *first* conceived in Abrams' bosom, *then* demonstrated or elicited by an ad hoc apparatus, designed or devised to elicit them, but which (we are now assured) had no business to elicit them, and, finally, have been elicited by an ad hoc contrivance devised or designed by Dr. Boyd to elicit them.

In other words, the apparatus of Abrams and of Boyd are not scientific arrangements designed or devised to amplify or utilise experience, but are contrivances designed or devised to satisfy a *wish* present to the mind of the inventors—namely, the *wish* to elicit the "reactions of Abrams."

Nothing is more certain than that any contrivance designed or devised to elicit physical phenomena, of a kind never experienced but simply imagined, will either (1) fail to satisfy the *wish* of the inventor, or (2) if it does apparently satisfy his wish will owe its seeming success to the operation of some factor which, consciously or unconsciously present to the mind of the inventor, escapes detection by trustful "investigators." This is axiomatic, and of immense importance in these affairs. In the case of an investigation, conducted in France during the war, by a small committee, of which I was a member, it became very clear that the inventor (who claimed to have worked under Abrams) had, at an early stage, and prior to all experience, become possessed by the *wish* to invent a wonder-working machine that would do certain things, the like of which had not until then been done. And the precocious obsession by such a wish can always be detected, whether we have to do with getting gold from the sea, petrol from tap-water, cucumbers from moonshine, or ectoplasmic limbs from a medium.

But there is another axiom. In all such cases a stage is reached at which investigators are asked (and sometimes join in asking) that personal assurances of good faith should be allowed to take the place of the production of such evidence as is needed to substantiate the claims made, and as could be furnished, were the claims substantial. When this demand is made the province of science has been left behind, and we enter a domain in which demonstrations of confidence are confused with proof of integrity.

In the case of Dr. Boyd's contrivances, we are asked, by the signatories to the report, to accept assurance as to the critical judgment of the research officer to the Society of Psychical Research *in place* of the *experimentum crucis!* Mr. Dingwall, I know, will not be surprised if I say, frankly, that I like not the security. And I am sure that Mr. Dingwall himself will not accept the proposition that faith in his negative findings should exempt men of science from the performance of a scientific duty. I am reminded of some delightful passages in the late Dr. Geley's last work. After assuring his readers of the perfect control always instituted during certain spiritualistic performances, he declares that, on one occasion, when some very beautiful manifestations were obtained, the controls were omitted, owing to the lively emotions sustained by the investigators. But this, says Dr. Geley, was of no importance. The beauty of the results firmly sustained the belief of the investigators in the good faith of the medium, a belief otherwise warranted by the institution of most rigorous controls on occasions when the results were *negative!*

Indeed, in all these situations the same *lacunæ*, the same excuses, and the same assurances return with almost calculated regularity. These recurrences, these *lacunæ*, do not authorise us to suggest fraud. But they do compel us to declare that, when they are present, the methods of scientific inquiry have not been followed.

Abrams began his career by performing a real service when, many years ago, he demonstrated his "lung reflexes." The sad comedy developed afterwards. That certain changes in percussion notes do occur in response to certain variations in muscular and visceral tone is now generally accepted. But, of any connexion between unseen bottles in hatches and changes in the percussion notes obtained over a little boy's belly, one can only say: *De non apparentibus et de non existentibus eadem est ratio.*

I am, Sir, yours faithfully,

F. G. CROOKSHANK.

Wimpole-street, W., Jan. 23rd, 1925.

BLOOD CHANGES IN SPRUE AND PERNICIOUS ANÆMIA.

To the Editor of THE LANCET.

SIR,—In his interesting paper which appeared in your columns on Jan. 10th (p. 75), Dr. C. Elders concludes that the blood picture of sprue cannot well be distinguished from that of pernicious anæmia, in respect particularly to its high colour-index so characteristic of that disease. The 12 blood counts in two cases of sprue which he records gave a colour-index above the normal—1·0—in no fewer than ten counts, was normal in one, and below normal in one, the average index being 1·2. The six counts in a case of pernicious anæmia gave an index above normal in all counts, the average being the unusually high one of 1·57, and the first count giving the extraordinary index of 2·4.

In view of other features of similarity presented in the two diseases these high figures of colour-index, if correct, are striking; and I therefore ask permission to say that they appear to me to require some further consideration and elucidation before any final judgment is based upon them. I desire to point out, that in all the 18 counts recorded the figures of colour-index given are as much as one-fifth to one-third higher than the actual colour-index yielded in the usual way by the percentages of hæmoglobin and of red cells given or obtainable from the data in the reports.

Thus, in the first count recorded, the figure of hæmoglobin—20 per cent.—divided by the percentage of red cells—viz., 980,000, or 19 per cent. of the normal 5,000,000—yields a colour-index practically normal, viz., 1·05; whereas in the report the colour-index for this count is given as 1·3. And similarly in all the other counts. When these are corrected the results as regards colour-index are very different from those stated in the reports. It then appears that in the two cases of sprue, instead of a colour-index above normal in ten out of 12 counts, it was *above normal in only three counts*, normal in one count, and below normal in no fewer than eight counts, the average being 0·97 instead of 1·2. On the other hand, in the case of pernicious anæmia the colour-index was above normal in four out of the six counts, and below normal in the other two; but the average was 1·28 instead of the unusually high one of 1·57.

Of all the blood changes in the disease pernicious anæmia, the most constant at all stages of the disease, in my experience of about 1000 counts in 200 cases, is a colour-index above normal, found in my cases in 83 per cent. of all blood counts, normal in 7 per cent. of counts, and below normal in only 10 per cent. of counts; average, 1·16. On the other hand, in all the

other cases of severe anæmia presenting degrees of blood change sometimes as low as 14 per cent. of red cells, comparable in degree or character with those of pernicious anæmia, the colour-index is found above normal in only 12 per cent. of counts, normal in 28 per cent., and below normal in no fewer than 60 per cent. of counts; average, 0·8.

This is the class of case which I have differentiated and term septic anæmia. Judged by these data, the anæmia of cases of sprue of the kind now recorded belongs to the class of anæmia of septic type, rather than to the class constituted by the great hæmolytic disease known by the name of pernicious anæmia.

I am, Sir, yours faithfully,

WILLIAM HUNTER.

Harley-street, W., Jan. 20th, 1925.

AIR-EMBOLISM FOLLOWING URETHROSCOPY.

To the Editor of THE LANCET.

SIR,—By a curious coincidence there appear in both *The Lancet* and *British Medical Journal* of this week (Jan. 17th, 1925) notes of cases of air-embolism following urethroscopy; the one by Mr. R. S. Roper, the other by Mr. K. V. Trubshaw. Attention is very properly drawn by both these surgeons to the dangers of aero-urethroscopy. I have myself had three cases of what I believe to have been air-embolism following urethroscopy, one of which, unfortunately, proved fatal.

(1) About 20 years ago, shortly after I was appointed assistant surgeon to the Royal Victoria Hospital, Belfast, I was examining in the out-patient department the urethra of a young adult male with Fenwick's aero-urethroscope, when the patient suddenly became rigid and appeared to be about to have an epileptic fit. The urethroscope was immediately removed and the symptoms passed off in a few minutes, leaving no after-effects.

(2) On June 1st, 1923, I was examining a man, aged 45 years, in my consulting room. The patient had a stricture in the bulbous portion of the urethra, through which I could only just thread a filiform bougie. After removing this bougie I passed the tube of a Wyndham Powell's urethroscope, and proceeded to distend with air. While I was inspecting the urethra the patient took an attack of dyspnœa and complained of pain in the left mammary region. He became faint, with a slow and feeble pulse. The tube was immediately removed and the symptoms passed off in a few minutes. Previous to this examination the patient had had filiform bougies passed, and since then has had an internal urethrotomy performed, and large metal dilators passed at regular intervals without any symptoms whatever.

(3) The third case was that of a stout, florid man, aged 67, with an impassable stricture. On Feb. 5th, 1922, I went some miles into the country to operate on him in the local hospital. Before the anæsthetic was administered I tried to pass a fine filiform bougie without success. This was followed by slight hæmorrhage. I now introduced the tube of a urethroscope which fitted rather tightly into the urethra. Air was being pumped in when we noticed that the patient was breathing stertorously, and had become cyanotic and unconscious, with dilated pupils and loss of corneal reflex. Notwithstanding all efforts to restore him death took place in a few minutes. A post-mortem examination was not allowed. If the anæsthetic had been given the death would have been wrongly attributed to it.

Now that attention has been drawn to this matter surgeons will be on the look-out for the first signs of distress in a patient undergoing an examination with the urethroscope, and may, perhaps, be warned in time to withdraw the instrument before serious symptoms have developed. Mr. Roper discusses the question of urethral shock and refers to cases occurring in St. Peter's Hospital. Thomson-Walker [1] faithfully records three cases which were under his care, two of which proved fatal. In all, a stricture was present, and in all the urethra had been examined under air-distension. The post-mortem examination of the fatal cases does not seem to have raised the question of air-embolism. It would be interesting to know if the brain was examined, as some of the symptoms in the recorded cases would seem to point to cerebral involvement.

We have now had sufficient experience of this accident to emphasise the importance of not using air-distension if any bleeding is present. It is also well to keep a close watch on the patient's condition, and instruct him to call out at once if he feels the slightest distress apart from the local discomfort of instrumentation. I wonder if urethral shock really occurs, and, if so, is it ever fatal. During many years of practice I have never seen anything beyond the faintness which any manipulation may produce in a patient who is frightened or nervous, except the alarming symptoms occasionally produced by the introduction of cocaine into the urethra, and directly attributable to the drug. The advantages of aero-urethroscopy are so obvious that there can be no question of abandoning it, but the risk of air-embolism must now be borne in mind.

I am, Sir, yours faithfully,

ANDREW FULLERTON,
Professor of Surgery, Queen's University of Belfast.

Jan. 19th, 1925.

[1] Genito-Urinary Surgery, Cassell and Co., 1914.

PICRIC ACID FOR BURNS.

To the Editor of THE LANCET.

SIR,—I am glad to see that Mr. H. S. Souttar, in his article on Burns and Scalds (THE LANCET, Jan. 17th), calls attention to the dangers of picric acid applications and has given up its use. I have never employed picric acid for burns and scalds, as I have found other methods more satisfactory. On several occasions I have seen very unpleasant complications result from picric acid; judging from my own observation, I do not think that medical men always realise that picric acid is tri-nitro-phenol. It is the phenol element that is poisonous, especially in little children.

I am, Sir, yours faithfully,

GEORGE PERNET, M.D.

London, W., Jan. 26th, 1925.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg. Comdr. J. Martin is placed on the Ret. List, with the rank of Surg. Capt.

H. A. M. Whitby to be Surg.-Lt.

ROYAL ARMY MEDICAL CORPS.

Capt. J. W. Malcolm is granted the local rank of Maj., for serv. with the Iraq Levies.

TERRITORIAL ARMY.

Lt.-Col. H. G. G. Mackenzie, having attained the age limit for retention, relinquishes his commn. and retains the rank of Lt.-Col.

TERRITORIAL ARMY RESERVE OF OFFICERS.

Lt.-Col. C. A. Lees, having attained the age limit, is retired, and retains his rank with permission to wear the prescribed uniform.

ROYAL AIR FORCE.

J. MacC. Kilpatrick is granted a short service commission as a Flying Officer.

Lt. V. P. Ellis, Dental Surgeon, General List, Army, is granted a temporary commission as a Flying Officer on attachment to the R.A.F.

INDIAN MEDICAL SERVICE.

Major Kunwar Shamsher Singh has handed over the duties of Superintendent of the District Jail at Rawalpindi to Lt.-Col. M. Corry and Lt.-Col. N. M. Wilson, the District Jail at Ambala to Major B. Gale and Lt.-Col. H. C. Keates, and the District Jail at Lyallpur to Lt.-Col. R. T. Wells.

The Governor of Bihar and Orissa has nominated Col. H. Ainsworth to be a member of his Legislative Council.

The King has approved the relinquishment of his temp. commission by Lt. Shanker Lal Gupta.

Obituary.

SIR JAMES MACKENZIE, M.D. EDIN., F.R.C.P. LOND., F.R.S., LL.D. ABERD.,

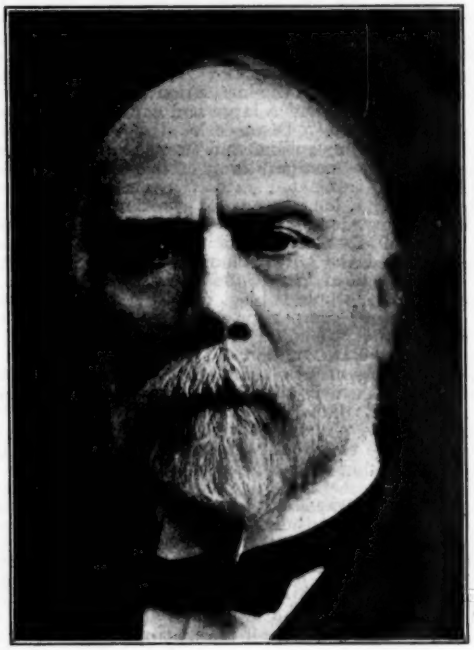
CONSULTING PHYSICIAN TO THE LONDON HOSPITAL; DIRECTOR, INSTITUTE OF CLINICAL RESEARCH, ST. ANDREWS.

WE regret to announce the death of Sir James Mackenzie which occurred at his London residence on Monday last.

Sir James Mackenzie was born in 1853 at Scone, where his father, Robert Mackenzie, resided. He received his early education at the Perth Academy, whence he proceeded to the University of Edinburgh as a medical student. After graduation in 1878 he held the house appointments at the Royal Infirmary of Edinburgh, immediately after which he studied for a short period in Vienna, and then migrated to Burnley, where he went into general practice and where he remained for nearly 28 years. He was a highly equipped man with a scientific outlook from the first, and it was in the conduct of his practice that he made close written observations upon signs and symptoms in his various cases which led eventually to his commanding position as a cardiologist.

But it was long before his researches yielded anything in the nature of a general message to science, and those who have followed his career know that the time which he spent in collecting and collating notes and verifying conclusions would have terrified a man less nobly absorbed by his double determination to arrive at truth and to do good. He has told us that he became in an early stage of his career as a doctor specially interested in the nature of heart affections because the symptoms from which the conditions had to be inferred were few in number, enabling investigations to be limited and comparisons to be instituted along definite lines. Gradually there unfolded before him the great design to clear up some of the obscurities darkening our knowledge of cardiac mechanism and our interpretation of cardiac symptoms, and, where possible, to bring organic changes in the heart into relation with the symptoms, ascertaining their significance in respect both of prognosis and treatment. Steadily, and undeterred by the exhausting routine of general practice, he pursued his observations of cardiac mechanism along original lines and by original methods whose efficacy was due greatly to the intensive watching of individual cases over long periods, for from the beginning Mackenzie felt that if the generally accepted foundations of cardiac therapeutics were to be labelled as insufficient or unsound, unimpeachable evidence must support the challenge. He recognised, of course, as everyone must, that much of the orthodox treatment of heart disease which held the field till 20 years ago was correct, but he saw also that routine was often employed which would only be useful in certain cases, and that the vital importance of many trivial signs indicating cardiac irregularity had passed unnoticed. His close study of these irregularities soon threw light upon functional derangements of the heart in an amazing manner, and further gave indications both for logical diagnosis, prognosis, and treatment. The arrhythmias and the manner in which the heart responds to the varied conditions that may be brought about by infectious diseases or by the exhibition of drugs were made the subjects of special research, and at length the minute and assiduous investigations carried on for many years began to obtain recognition, and as each contribution to our learning was published new adherents were gained.

While still at Burnley he published a notable work, "The Study of the Pulse," and made good some of his conclusions which had been considered speculative when first promulgated; but probably his labours were first made clear to anything like a large audience at a meeting of the British Medical Association at Toronto in 1906. On the voyage to this gathering our representative noticed how in a circle, which included also Henry Ashby, Clifford Allbutt, and Sims Woodhead in particular, Mackenzie's colloquial demonstrations of the bundle of His and reflections on similar sides of his deeply thought-out views, would cut right across text-book instruction, and yet appear convincing in their logicality; and when he read his contribution those who had heard his preliminary and informal disquisitions were not surprised at its effect. Prof. Aschoff opened the discussion, which centred around heart-block, with a description of the anatomical-pathological basis of irregularities and failure of heart muscle, the result of investigations



SIR JAMES MACKENZIE.

made by himself and Dr. Tawara upon the intracardiac muscles. This formed an excellent prelude to Mackenzie's paper, which described with full illustrations the phenomena of heart-block. He showed how his conclusions had been arrived at by the personal following-up, over 20 years or more, of groups of cases, tracing the association of the signs and symptoms—especially pain—with the passage of time, with the general conditions of the patient, and with accidental circumstances, and indicating his method employed for detecting and standardising intracardial lesions. He pointed out that the stimulus for contraction from auricle to ventricle through the bundle of His, if depressed, will result in a prolongation of the interval between auricular and ventricular contractions, until the ventricular systole may drop out or respond irregularly to auricular beats. He then explained the methods which he had devised for appreciating affections of the bundle.

Recognising that in cardiac disorder it is necessary to obtain information in regard to the movements of the different chambers of the heart, he devised instruments convenient for the purpose by modifying the sphygmograph so that simultaneously with a radial tracing the record of other movements connected with the circulation or respiration could be noted. He laid down that the essential requisite for

the interpretation of the tracings of any movements of the circulation is a standard by which different phases of cardiac revolution can be recognised, and, taking the radial pulse as that standard, its cause being known and its position in the cardiac cycle being fixed, he was able to record any movements occurring before, with, or after the radial pulse, and refer them to forces having a definite period in the cardiac cycle. He produced graphic illustrations of simultaneous tracings of the carotid and radial pulses, showing the duration of the interval between them; and also simultaneous tracings of the apex beat and the radial pulse, and of the apex beat and the jugular vessels and the radial pulse, while by other tracings he illustrated graphically the influence of rest and of depressing disease, as well as of vagus stimulation and of the various phenomena of heart-block.

In 1907 he came to London and took up consultative practice. He was immediately appointed lecturer in cardiac research at the London Hospital and elected physician to the institution, and in the following year brought out a large and carefully illustrated volume entitled "Diseases of the Heart," which had a great reception and went through several editions in a comparatively short space of time, being also translated into German, French, and Italian. The long years of waiting were triumphantly rewarded by private practice in overwhelming quantity and unstinted official recognition. In 1911 he delivered the Oliver-Sharpey Lectures before the Royal College of Physicians of London, in which he reviewed the whole subject of heart failure, forming a penetrating comparison between the old and the modern conceptions. The lectures were published in full in THE LANCET, and did not escape criticism in detail, for researches had been made since his earlier work, with which all are now familiar, and which necessitated, perhaps, more variations in his views than he was prepared to allow; but the enormous value of the researches that he had pursued steadily for a working generation was acclaimed on all hands.

During the war Mackenzie played a prominent part in assisting the authorities to evaluate heart disease as structural or functional, and as temporary or permanently incapacitating its victims. He was appointed physician to the King in Scotland, in 1915 he was knighted, and in 1916 was elected F.R.S. But at the cessation of hostilities, and when at the zenith of his fame, he closed down all his metropolitan work and went to St. Andrews, where he founded the Clinical Institute, with the broad intent to bring the methods of general practice into touch with the methods of research. There he worked steadily for four years in close touch with his collaborators, and the outcome of some of their labours has already been published widely. The tribute from his St. Andrews colleagues, which Dr. David Waterston sends, explains what it must have meant to Mackenzie to leave London, and suggests the wide scope of his final interests.

About a year ago he became by a tragic coincidence the victim of the cardiac affection which was the subject of his last written work, for he died of angina pectoris.

His literary work includes besides his famous treatise "Diseases of the Heart," of which a fourth edition is shortly to be issued, with the author's revision, by the Oxford University Press; "Symptoms and their Interpretation," and "The Principles of Diagnosis and Treatment in Heart Disease," both of which have been the subject of wide translation and re-issue; a treatise on "Heart Disease in Pregnancy" and one on "Angina Pectoris," which was published last year. He was also the author of contributions to two volumes of "Reports of the St. Andrews Institute," the second of which is reviewed this week in our columns; he delivered the Gibson Memorial Lecture before the University of Edinburgh and the Schorstein Lecture at the London Hospital.

He married in 1887 Frances, daughter of Mr. George Jackson, who survives him.

A TRIBUTE TO SIR JAMES MACKENZIE FROM HIS ST. ANDREWS COLLEAGUES.

Dr. DAVID WATERSTON writes:

"In the deep sense of recent personal loss, it is not easy for his St. Andrews colleagues to pay an adequate tribute to the memory of Sir James Mackenzie, and it is possible only briefly to mention some aspects of his work and his influence there.

"Sir James Mackenzie's work culminated in his foundation of the Institute for Clinical Research at St. Andrews. The reasons which induced him to found the Institute there and the special line of research which he desired the Institute to represent have been fully expounded by himself in various papers and in the reports of the Institute. As a clinical investigator his work began with the observations which he made while in practice in Burnley. His busy consulting and hospital practice in London added to the wealth of his experience, but it was in his work at the Clinical Institute that he summed up and put forth the considered conclusions drawn from the clinical observations made during the course of his life's work.

"The conception of an Institute devoted to clinical investigation was the outcome of his pioneer work as an investigator while a general practitioner. He formulated the fundamental truth that medicine is a special branch of science dealing with a special group of phenomena to which the clinical investigator must apply the methods which are specially suitable for his purpose. Other sciences have their contribution to make to medicine, but they are to be regarded as only ancillary and not replacing the proper methods of clinical investigation into the phenomena of ill-health and disease which afford the material for study. Among other things, it was essential, in his view, to employ the opportunities the general practitioner alone possesses of watching the 'life-history' of ill-health in patients over a long course of years.

"St. Andrews was known to him, was a place of convenient size, and seemed in other respects suitable for launching his great enterprise. After paying some visits to it he decided to give up his appointments and his work in London and to devote his energy and ability to this new field. What it meant to leave London and his work there is not easily estimated. The London Hospital authorities had given him every facility for special hospital work. His position had been recognised as a great consultant, clinician, and teacher. He deeply appreciated the facilities which had been afforded him both at the London Hospital and at the Hampstead Hospital (Mount Vernon). But he realised that he could not in London carry on the work which he felt was fundamentally necessary for the advance of medicine, and after full consideration he decided to abandon this work and to devote himself to founding a Research Institute.

"He came to St. Andrews unknown by name to all but a few of his medical colleagues and began at the cottage hospital a series of clinics in the out-patient department, to which he soon attracted all the practitioners. These clinics rapidly produced the desired effect and aroused in his audience the desire to coöperate in the work which he showed was waiting to be done. With the assistance of generous friends who were deeply interested in his ideas, and with his own financial help, a suitable building was secured and fitted up, and the definite work of the Institute was begun. At a later stage, as the usefulness and value of the work became realised, additional help was given by the Carnegie Trust and by the Medical Research Council.

"Of the work which has been accomplished at the Institute this is not the occasion to write at length, nor is it possible as yet fully to estimate the significance and the far-reaching results of this pioneer movement in medicine. It has already had an influence far wider than a merely local one, and medical thought and medical practice in many countries of the world have received from it direction and guidance. The recent award of the Mickle Fellowship of the University

of Toronto is an illustration of the wide recognition given to his work in St. Andrews. For three years he devoted his whole time and thought to the work of the Institute and to the training of those who worked with him there, and then, satisfied that he had laid down the lines for their work, he gradually withdrew himself from active direction, and gave to the members of the Institute the opportunity of carrying on the work by themselves. At a still later stage his health began to fail, and he decided to winter in a milder climate, but to the very last the welfare of the Institute was foremost in his interests and thought.

"It is not easy for his colleagues to realise fully the extent of the loss they have sustained by his sudden death. His vivid personality and the vigour of his mind had made a deep impression upon them, and the stimulus of coming into contact with him in discussion and debate was of incalculable benefit to them all. They realised the greatness of his genius and his extraordinary insight into medicine, and they had come to look upon him not only with respect and admiration, but with the most sincere affection.

"Great as was the influence of his personality his colleagues feel that the value of his work did not depend upon that element, and will not end with his death. Not only in his work upon the heart, but in the wider field of general medicine, his observations and the principles which he has deduced from them are of permanent and abiding value."

SIDNEY BARWISE, B.Sc. BIRM., M.D. LOND., D.P.H. CAMB.

THE sudden death on Jan. 24th of the medical officer of health for Derbyshire came as a shock to his many friends in the public health service. Dr. Barwise was in his sixty-third year, but he had retained the keenness and energy of youth and up to the last gave the impression of having many more years of active life in front of him. His student days were spent in Birmingham where, as a pupil of Dr. Alfred Hill, then medical officer of that city, he acquired a keen interest in chemistry. After holding residential appointments at the Queen's Hospital in Birmingham, Barwise took the D.P.H. at Cambridge in 1889 and became medical officer of health of Blackburn. While there he made a useful report on the smoke nuisance. In 1891 he was appointed, from among 56 applicants, medical officer of health for Derbyshire, a position which he held for nearly 35 years. His intimate knowledge of chemistry and his subsequent experience soon marked him out as an expert in the questions of sewage purification and the prevention of the pollution of rivers. During the gradual change over from the environmental to the domestic aspect of public health, Dr. Barwise's keen intellect enabled him to adapt himself to the new conditions, and through his instrumentality Derbyshire is now regarded as one of the most progressive counties in nursing, maternal care and child welfare, dental treatment, and all matters appertaining to the school medical service. Recent instances of his activities have been campaigns in favour of clean milk and of what is known as the newer knowledge of nutrition. In his last report considerable space was devoted to helio-therapy and helio-hygiene; in the Derbyshire sanatoriums all the various treatments which have been recommended for tuberculosis have been tested. This report also contained an important administrative study of goitre, which has been reprinted, and it will be for others to initiate action on the lines advocated with a view to making "Derbyshire neck" a thing of the past.

The methods which Dr. Barwise adopted in sifting new proposals were thorough, but when once he had made up his mind he took a strong line. As was natural, he occasionally aroused considerable opposition, as in the recent case of the employment of dental dressers. Those who heard Dr. Barwise explain his views on this subject felt that, in his hands at any rate, the scheme was sound and did actually give results. His opponents in this and other matters would be the first to acknowledge that Dr. Barwise, though keen, was a courteous and fair fighter. In a period of rapid advance in the science and art of public health Dr. Barwise will be remembered as one who was never content with achievement, and was always ready to consider and adopt new measures.

CHARLES MOLESWORTH TUKE, M.R.C.S. ENG.

Dr. Charles Tuke, whose death occurred in London on Jan. 24th, bore a name associated for several generations with the enlightened care of the mentally ailing, but was not an actual descendant of William Tuke, the founder of the York Retreat. His father was Dr. T. Harrington Tuke, for many years proprietor of a private asylum at the Manor House, Chiswick, and Charles Tuke, in coöperation with his brother, the late Thomas Seymour Tuke, for many years carried on the father's work at Chiswick House, to which beautiful place the institution was removed. Charles Tuke was a student at St. George's Hospital, where he held several house appointments before becoming resident clinical assistant at Bethlem Royal Hospital, which, and his family connexions, determined his future outlook. He was an active member of the Medico-Psychological Association and became President of the West London Medico-Chirurgical Society. In his younger days he was a well-known cricketer, for several seasons being a successful bowler in the Middlesex county team.

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED JAN. 17TH, 1925.

Notifications.—The following cases of infectious disease were notified during the week, namely—small-pox, 113; scarlet fever, 1910; diphtheria, 1089; enteric fever, 27; pneumonia, 1261; puerperal fever, 47; cerebro-spinal fever, 9; acute poliomyelitis, 6; acute polio-encephalitis, 1; encephalitis lethargica, 31; continued fever, 3; dysentery, 13; ophthalmia neonatorum, 81. There were no cases of cholera, plague, or typhus fever notified during the week. The number of small-pox cases exceeded 100 for the first time for a twelvemonth.

The cases of dysentery were notified, one from the metropolitan borough of Southwark, the others from the following counties: Chester, 1 (Macclesfield); Durham, 1 (Sunderland); Gloucester, 2 (Bristol); Lancaster, 1 (Whiston R.D.); Stafford, 1 (Cheadle R.D.); Surrey, 3 (Woking); Yorks E. Riding, 1 (Kingston-upon-Hull); Yorks W. Riding, 2 (Leeds).

Deaths.—In the aggregate of great towns including London, there were 6 deaths from enteric fever, none from small-pox, 13 from scarlet fever, 49 from diphtheria, 56 from measles; 142 from influenza, as compared with 124, 100, and 83 in the three preceding weeks. In London itself the deaths from diphtheria numbered 12 and from whooping-cough 34.

THE case of Rex *v.* Bateman will be before the Court of Criminal Appeal on Monday next, Feb. 2nd.

ROYAL SANITARY INSTITUTE.—A sessional meeting will be held at 90, Buckingham Palace-road, London, S.W., on Tuesday, Feb. 10th, at 6 P.M., when a discussion will take place on Food and Health, to be opened by Major-General Sir Wilfred Beveridge, followed by Dr. W. M. Willoughby. The chair will be taken at 6 P.M. by Dr. Louis C. Parkes, deputy chairman of the Council.

MANCHESTER'S FILM CRUSADE AGAINST VENEREAL DISEASE.—A campaign to fight venereal disease was begun on Jan. 26th and will be continued until Feb. 14th. By means of a series of kinematographic films, the Manchester Public Health Department will endeavour to draw the attention of the public to the gravity of venereal diseases and the urgent need from the social and individual standpoint for immediate and continued treatment at the free clinics which are provided in the city. Men and women and girls over 15 years and boys over 17 years are invited, and the film displays will be free. Films of a biological character will be shown at meetings for women only. The films will be shown at various public halls in the city and in adjacent townships. Amongst the films which are to be shown are "The End of the Road," "Damaged Goods," "How Life Begins," "The Shadow," and "The Flaw." All the films to be shown have the approval of the Ministry of Health and the Public Health and Watch Committee of the city.

Medical News.

UNIVERSITY OF OXFORD: *Scholarships in Natural Science.*—Scholarships in Natural Science (for which intending students of medicine are eligible equally with others) are offered for competition as follows: Keble College, examination beginning on March 16th; Merton, Exeter, New, Brasenose, Corpus Christi, and Wadham Colleges examination beginning on March 17th.

The Romanes Lecture for 1925 will be delivered by Sir William Bragg, F.R.S., Hon. Fellow of Trinity College, Cambridge, and Fullerian Professor of Chemistry at the Royal Institution, in the Sheldonian Theatre, on May 20th, at 5.30 P.M., on the Crystallin State.

UNIVERSITY OF LONDON.—A course of eight lectures on the Chemistry of the Internal Secretions will be given by Dr. E. C. Dodds, lecturer in biochemistry and chemical pathologist to the Middlesex Hospital, at Middlesex Hospital Medical School, Cleveland-street, W., at 5 P.M., on Tuesdays and Thursdays, Feb. 3rd, 5th, 10th, 12th, 17th, 19th, 26th, and March 3rd. Attendance at this course is recognised in connexion with the B.Sc. (Honours) Degree in Physiology. A course of four lectures on the Medullary Centres will be given by Dr. J. M. Duncan Scott at St. Bartholomew's Hospital Medical School, 6, Giltspur-street, E.C., at 5 P.M., on Wednesdays, Feb. 11th, 18th, 25th, and March 4th. Admission to both courses of lectures is free.

SOCIETY OF APOTHECARIES OF LONDON.—At examinations held recently the following candidates passed in the subjects indicated:—

Surgery.—A. J. Dowek, Manchester; T. McD. Kellough and J. Maingard, Guy's Hosp.; E. J. P. McDowell, St. Thomas's Hosp.; A. Mishriky (Sect. II.), St. Mary's Hosp.; B. L. Steele, Univ. Coll. Hosp.; and C. C. Taffs, St. Thomas's Hosp.

Medicine.—W. Bentley, Birmingham; C. V. Brown (Sect. I.), Guy's Hosp.; N. E. Challenger, McGill; L. Freeman, St. Thomas's Hosp.; E. F. Hottinger, St. Mary's Hosp.; R. C. Pratt (Sect. I.), Birmingham; C. W. Warne, Guy's Hosp.; and D. Winstanley, Liverpool.

Forensic Medicine.—N. E. Challenger, McGill; E. F. Hottinger and W. Johnson, St. Mary's Hosp.; W. Irving Pierce, Boston, U.S.A.; R. J. Rutherford, Durham; and H. Winstanley, Liverpool.

Midwifery.—M. R. Burke, St. George's Hosp.; F. Carroll, St. Mary's Hosp.; C. E. Hagenbach, St. George's Hosp.; E. F. Hottinger, St. Mary's Hosp.; A. J. Moody, St. Bart.'s Hosp.; K. E. R. Robertson, St. Mary's Hosp.; and H. Winstanley, Liverpool.

The Diploma of the Society was granted to the following candidates entitling them to practise medicine, surgery, and midwifery: A. J. Dowek, L. Freeman, E. F. Hottinger, E. J. P. McDowell, A. J. Moody, C. C. Taffs, and C. W. Warne.

EDINBURGH UNIVERSITY ALUMNI ASSOCIATION.—A meeting of the Alumni Association of Edinburgh University was held on Jan. 23rd in the McEwan Hall, at which the Earl of Balfour, K.G., Chancellor of the University, delivered an address. Sir Harold Stiles, the founder of the movement a year ago, took the chair, and in opening the meeting stated that having seen the great benefits which accrued from similar institutions in America, he had suggested that an Alumni Association be instituted in Edinburgh University. The object was to try to produce a relation between Alumni of the University in all parts of the Empire, and to do everything to promote the interests of their Alma Mater. The movement had taken root, 842 graduates had joined, and £1075 had been subscribed. That very morning he had received from one of his old house surgeons, Dr. Charles Cooper of San Francisco, a gift of £1000 to be used in giving practical advice to young graduates in research. Lord Balfour commenced by saying that he rejoiced in having an opportunity of addressing representatives of the University with which he was so closely connected on a subject which he was convinced was going to have in this country, as it has already had in America, a great and growing success. The subject touched a side of University life too often forgotten; the individual graduate was too apt to consider a University as a mechanism for imparting a certain amount of learning. This, doubtless, he said, was its main and primary object, but a man who leaves a university having only obtained a modicum of intellectual education and a certain equipment for the struggle of life is a man greatly to be pitied; a university gave a man much more than this. Anybody who had been through a university, and who had tried to measure all he has gained from its instructions and its life would find that after all it was the human intercourse which accompanied it, patriotism and traditions, which all combined to form a bond of union. Another side of the question was that of money. For this he felt strongly, that large sums should not be asked of any member of the Association. The sum asked was deliberately kept within the means of those whose incomes were small, but it was to be hoped that the obligatory sum would in many cases be exceeded, especially by those Alumni whose success was due to their past training. The cost of medical teaching had greatly increased, and the cost of research had been added to it in every university worth the name. Literature, mathematics, history, philosophy, and theology given a suitable building, good lecture rooms, good lecturers, and willing students might be taught at no great expense, but in the case of medicine and experimental science the cost of teaching was growing—it could not be done on the cheap. Debts of gratitude, he continued, were due to citizens of Edinburgh for the help they had afforded, also to such bodies as the Rockefeller Trust. Students' fees and endowments from Government and local authorities, however, were not sufficient; what was required was that past members of the University should subscribe according to their means, and that the money collected be turned to the best account.

HUNTERIAN SOCIETY.—The annual dinner will be held at the Hotel Victoria, Northumberland-avenue, on Feb. 12th at 7.30 P.M. Fellows are asked to notify the hon. secretaries, at 94, Harley-street, W. 1, as soon as possible the number of guests they intend to bring.

RONTGEN SOCIETY.—A meeting will be held on Feb. 3rd at 8.15 P.M. in the British Institute of Radiology, 32, Welbeck-street, London, W., when a paper on Constant Voltage High Tension Generators will be read by Major C. E. S. Phillips and one on Some Further Aspects of the Theory and Operation of Potter-Bucky Diaphragms, by Mr. C. H. Holbeach, who will also give a demonstration of the new C.D.X. dental X ray equipment.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION.—On Monday, Feb. 2nd, Mr. Arthur Giles will lecture for the Fellowship of Medicine on the Operative Treatment of Uterine Displacements. The lecture will be delivered in the West Lecture Hall of the Royal Society of Medicine at 5.30 P.M. During the month of February the following courses will be held: A three weeks' combined course in Diseases of Children, arranged by the Paddington Green Hospital, Victoria Hospital, and the Children's Clinic; a four weeks' course in Dermatology at the St. John's Hospital for Diseases of the Skin; a month's course in Venereal Diseases at the London Lock Hospital, and as this course is not held unless eight entries are received early application is desirable; and eight clinical demonstrations (twice a week) spreading over a month at the School of Tropical Medicine. For the last fortnight of February a course will be held in General Medicine and Surgery and the Special Departments, at the North-East London Post-Graduate College (Prince of Wales's Hospital, Tottenham, N.), for which early application should be made. In March there will be courses in Diseases of the Chest, Brompton Hospital; Medicine, Surgery, and Gynæcology, at the Royal Waterloo Hospital; Gynæcology, at the Chelsea Hospital for Women; Infectious Fevers, at the North-Eastern Hospital, Tottenham; and an intensive course dealing with Medicine, Surgery, and the Various Specialties, at the Royal Northern Hospital, with which will be associated the Royal Chest Hospital. Copies of the syllabus of the above-mentioned courses, together with the Fellowship Bulletin, may be had on application to the Secretary at 1, Wimpole-street, W. 1.

THE MINISTER OF HEALTH ON HIS PLANS.—Under the auspices of the People's League of Health, a deputation waited on Mr. Neville Chamberlain on Jan. 27th. The deputation was introduced by Viscount Burnham, and its object was to submit to the Minister the resolutions passed at the Conference convened by the League, held at the British Empire Exhibition, Wembley, last May. The members of the deputation included: Prof. J. G. Adami, Sir W. Arbuthnot Lane, Sir Harry Baldwin, Dr. H. Scurfield, Sir Leonard Rogers, Sir William Simpson, Dr. A. F. Tredgold, Mr. C. J. Bond, Prof. H. R. Kenwood, Colonel S. Lyle Cummins, Dr. Jane Walker, Prof. F. E. Wynne, Prof. G. M. Robertson, Prof. W. E. Dixon, Lieut.-Col. F. E. Fremantle, Mr. E. B. Turner, Mrs. Scharlieb, M.D., and Miss Olga Nethersole. The Minister of Health, replying to the deputation, said that the department had already issued a pamphlet on diet. He doubted whether a Government department could properly undertake the issue of popular leaflets which must necessarily be in a form open to criticism by specialists. But he contemplated that further pamphlets would be issued by the department which might be made a basis of popular leaflets prepared by more suitable bodies. He would give further consideration to the question. He was advised that the public were getting far more careful about the kinds of prepared foods that they gave to children; but he agreed that possibly something more needed to be done by regulation, and he was considering the framing of regulations on this subject. He proposed

to accept generally the recommendations of the Food Preservatives Committee, which would be circulated in draft so that the interests concerned could make out any case they had against them. In view of the many Government measures urgently requiring to be passed through, he doubted whether it would be politic to introduce legislation for the abatement of the smoke nuisance this session, but he hoped to secure it an early place in the Government programme next year. As to provision of facilities for the early treatment of mental cases, the fact that he had himself prepared a Bill when previously in office was an earnest of his intentions in this matter. He was informed that the Board of Education were about to make special provision for dealing with children who had suffered from encephalitis lethargica. The securing of better coördination of hospital services was an aim with which he was in entire sympathy. The reform of the Poor-law, which was essential to this object, would be dealt with by the Government as soon as possible. He quite recognised the risk of the spread of tuberculosis by adults suffering from the disease. He thought that it would be better to remove the source of infection from the children rather than the children from the source of infection, because if the source of infection was not removed though it might not affect children it would probably infect somebody else. Many local authorities had in private Bills taken power to remove tuberculous cases compulsorily, and he was prepared to give general powers to local authorities in amending the Public Health Bill which he contemplated introducing as early as possible. That Bill would be a preliminary to the consolidation of the Public Health Acts, and he hoped that it might be possible to get both these measures through in the coming session. He also hoped that if not this session, at any rate next, he would be able to get through a Bill amending the Midwives Act. The Home Office at present had a committee under the chairmanship of Mr. Justice Tomlin considering the subject of amendment to Part I. of the Children Act, 1908, and he hoped that legislation on this subject also would be possible at an early date. He associated himself with the resolution, congratulating Miss Nethersole and her helpers on the success of the Conference.

Medical Diary.

SOCIETIES.

THE ROYAL SOCIETY, Burlington House, Piccadilly, W.
THURSDAY, Feb. 5th.—4.30 P.M. *Papers to be read:* H. M. Carleton: Growth, Phagocytosis, and other Phenomena in Tissue Cultures of Fœtal and Adult Lung. (Communicated by Sir Charles Sherrington, O.M., P.R.S.) F. W. Fox and J. A. Gardner: The Origin and Destiny of Cholesterol in the Animal Organism. Part XIV.—The Cholesterol Metabolism in Normal Breast-fed Infants. (Communicated by Sir Walter Fletcher). H. H. Thomas: The Caytoniales. A New Group of Angio-spermous Plants from the Jurassic Rocks of Yorkshire. (Communicated by Prof. A. C. Seward.) Winifred Brenchley and H. G. Thornton: The Relation Between the Development, Structure, and Functioning of the Nodules on *Vicia Faba* as Influenced by the Presence or Absence of Boron in the Nutrient Medium. (Communicated by Sir John Russell.)—*Papers to be read in title only:* A. S. Rau, F. W. R. Brambell, and J. B. Gatenby: Observations on the Golgi Bodies in the Living Cell. (Communicated by Prof. J. P. Hill.) V. Nath: Cell Inclusions in the Oögenesis of Scorpions. (Communicated by Prof. J. Stanley Gardiner.) L. J. Harris: The Combination of Proteins, Amino-acids, &c., with Acids and Alkalis and their Combining Weights, as Determined by Physico-chemical Measurements. (Communicated by Sir Frederick Hopkins.)

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

MEETINGS OF SECTIONS.

Tuesday, Feb. 3rd.

ORTHOPÆDICS: at 5.30 P.M. (Cases at 5 P.M.)
Cases:
Mr. W. H. Ogilvie: (1) Case of Paralytic Dislocation of the Hip-joint. (2) Case of Rickets with Unusual Deformities.
Mr. R. C. Elmslie: Two Cases of Scoliosis with Paraplegia.
Mr. H. A. T. Fairbank (President): (1) Case of Unilateral Imperfect Formation of Hip-joint: Subluxation with Spontaneous Recovery. (2) Specimen, &c., of Unusual Osteoma from Case of Multiple Exostoses.
Other cases will be shown.
Will members wishing to show cases please send their notes to the hon. secretary, Mr. P. Jenner Verrall, 116, Park-street, W.

PATHOLOGY: at 8.30 P.M., at the National Institute for Medical Research, Hampstead, N.W. 3.
Demonstrations:
J. Brownlee: Charts Illustrating Changes in Immunity with Age.
A. Eidinow: The Effect of Irradiated Blood on Hæmobactericidal Power.
H. H. Dale, F. M. Durham, and J. E. Marchal: The Effect of "Bayer 205" on Trypanosomes.
J. Smiles: The Action of Light on Bacteria.
J. E. Barnard: A Method of Demonstrating the Development of Young Colonies with High Powers.
H. W. Dudley and O. Rosenheim: Demonstration of Spermine Phosphate from Various Tissues.
W. Mair: A Peculiar Reaction to Filtrates of Pneumococcal Cultures.
S. R. Douglas: Some Remarks on Möllgaard's Chemotherapeutic Treatment of Tuberculosis.
Communications:
W. J. Purdy: The Temperature of Normal Rabbits.
P. Hartley: Further Observations on the Rôle of the Ether-soluble Constituents of Serum in Certain Serological Reactions.

Wednesday, Feb. 4th.

SURGERY, ANÆSTHETICS, MEDICINE, OBSTETRICS & GYNÆCOLOGY, PATHOLOGY — *Special Discussion:* at 8 P.M.: The Prevention and Treatment of Post-operative Pulmonary Affections.
Speakers:
Sir Charles Gordon-Watson and Mr. E. C. Lindsay (Surgery), Dr. F. E. Shipway (Anæsthetics), Lord Dawson of Penn (Medicine), Mr. J. Prescott Hedley (Obstetrics), and others.
N.B.—If necessary, this discussion will be adjourned to Friday, Feb. 6th, at 8.30 P.M.

Friday, Feb. 6th.

LARYNGOLOGY: at 5 P.M. (Cases at 4 P.M.)
Cases will be shown by Mr. H. M. Wharry, Mr. Herbert Tilley, Mr. Norman Patterson, Mr. H. Bell Tawse, Dr. W. H. Kelson, Mr. F. J. Steward, Mr. T. B. Layton, Dr. T. B. Jobson.

Saturday, Feb. 7th.

OTOLOGY: at 10.30 A.M. (Cases at 9.45 A.M.)
Cases will be shown.
Demonstration:
Mr. Lionel Colledge: Kinematograph Pictures of Cases of Facial Paralysis Treated by Nerve Anastomosis.
Paper:
Mr. G. J. Jenkins: Septicæmia as a Complication of Middle-ear Infection.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn-fields, W.C.
MONDAY, Feb. 2nd.—5 P.M., Prof. Zachary Cope: Extravasation of Bile.
WEDNESDAY.—5 P.M., Prof. H. P. Winsbury White: The Pathology of Hydronephrosis.
FRIDAY.—5 P.M., Prof. A. H. Todd: Syphilitic Arthritis.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION.
MONDAY, Feb. 2nd, to SATURDAY, FEB. 7th.—WEST LECTURE HALL, Royal Society of Medicine, 1, Wimpole-street. Lecture arranged by the Fellowship of Medicine and open to all members of the profession. Monday, Feb. 2nd, 5.30 P.M., Mr. Arthur Giles: The Operative Treatment of Uterine Displacements.—COMBINED COURSE IN DISEASES OF CHILDREN, Paddington Green, Victoria Hospital and Children's Clinic. Two sessions daily.—LONDON LOCK HOSPITAL. Comprehensive Course. Clinical work daily and lectures at Dean-street Monday, Tuesday, Thursday, and Friday.—ST. JOHN'S HOSPITAL FOR DISEASES OF THE SKIN. Demonstrations daily in the various departments. Pathological demonstrations arranged for and Tuesday and Thursday special lectures. Tickets for this particular course from the Fellowship.—LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE (Tropical Section, Endsleigh Gardens). Tuesday and Thursday, 2 P.M. Clinical Demonstration by Dr. G. C. Low and Dr. P. Manson-Bahr.

WEST LONDON POST-GRADUATE COLLEGE, West London Hospital, Hammersmith, W.
MONDAY, Feb. 2nd.—12 noon, Mr. Simmonds: Applied Anatomy. 2 P.M., Mr. Addison: Surgical Wards. 2 P.M., Mr. Bishop Harman: Eye Dept.
TUESDAY.—11 A.M., Dr. Endean: Venereal Diseases. 12 noon, Dr. Burrell: Chest Cases. 2 P.M., Mr. Banks-Davis: Throat, Nose, and Ear Dept.
WEDNESDAY.—12.15 P.M., Dr. Burnford: Medical Pathology. 2 P.M., Dr. Dowling: Skin Dept. 2.30 P.M., Mr. Donald Armour: Surgical Wards.
THURSDAY.—10 A.M., Dr. Grainger Stewart: Neurological Dept. 12 noon, Mr. Sinclair: Surgical Dyspepsia. 2 P.M., Mr. MacDonald: Genito-Urinary Dept.
FRIDAY.—11 A.M., Dr. McDougal: Electrical Dept. 12 noon, Surgical Registrar: Surgical Pathology. 2 P.M., Mr. Vlasto: Throat, Nose, and Ear Dept.
SATURDAY.—9.30 A.M., Dr. Burnford: Bacterial Therapy. 10 A.M., Dr. Saunders: Medical Diseases of Children. 10 A.M., Mr. Banks-Davis: Operations on Throat, Nose, and Ear.
Daily, 10 A.M. to 6 P.M., Saturdays, 10 A.M. to 1 P.M., In-patients, Out-patients, Operations, Special Departments.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.
TUESDAY, Feb. 3rd.—4.30 P.M., Dr. L. R. Yealland: The Differential Diagnosis of Fits.
FRIDAY.—4.30 P.M., Mr. H. W. Carson: Prognosis in Breast Cancer.
Daily, In-patient and Out-patient Cliniques, Operations, Cliniques in Special Departments, &c.

NATIONAL HOSPITAL FOR THE PARALYSED AND EPILEPTIC, Queen-square, Bloomsbury, W.C. 1.
POST-GRADUATE COURSE: FEB.-MARCH, 1925.
CLINICAL LECTURES AND DEMONSTRATIONS.
MONDAY, Feb. 2nd.—2 P.M., Out-patient Clinic: Dr. Hinds Howell. 3.30 P.M., Epilepsy: Dr. Aldren Turner.
TUESDAY, Feb. 3rd.—2 P.M., Out-patient Clinic: Dr. Adie. 3.30 P.M., Compression Paraplegia due to Tumours: Mr. Armour.
THURSDAY, Feb. 5th.—2 P.M., Out-patient Clinic: Dr. Kinnier Wilson. 3.30 P.M., The Diagnostic Significance of Tremors: Dr. Risien Russell.
FRIDAY, Feb. 6th.—2 P.M., Out-patient Clinic: Dr. Gordon Holmes. 3.30 P.M., Some Forms of Acute Encephalitis: Dr. James Collier.
COURSE OF LECTURES AND DEMONSTRATIONS ON THE PATHOLOGY OF THE NERVOUS SYSTEM.
THURSDAY, Feb. 5th.—12 noon, The Cerebro-spinal Fluid, Physiology and Pathology: Dr. J. G. Greenfield.
COURSE OF LECTURES AND DEMONSTRATIONS ON THE ANATOMY AND PHYSIOLOGY OF THE NERVOUS SYSTEM.
MONDAY, Feb. 2nd.—12 noon, Spinal Cord and Medulla: Dr. Hinds Howell.
The Fee for this Course will be £2 2s.
Dr. H. J. MacBride will give a COURSE OF EIGHT CLINICAL DEMONSTRATIONS, chiefly on METHODS OF EXAMINATION OF THE NERVOUS SYSTEM, in the Wards at 10 A.M. on Tuesdays and Fridays, if sufficient entries are received. The Fee for this Course will be £2 2s.
COURSE OF LECTURES AND DEMONSTRATIONS ON THE NEUROLOGY OF THE EYES.
WEDNESDAY, Feb. 4th.—3.30 P.M., The Optic Nerve: Mr. Leslie Paton.
Applications for this Course should be made early. Fee, £5 5s., if taken as a separate Course, or £3 3s. if taken with the General Course.
Mr. Armour and Mr. Sargent operate at the Hospital on Tuesday and Friday mornings at 9 A.M., or at such other times as may be announced.
Any part of the Course may be taken separately. Special arrangements will be made for those unable to take the whole Course. Fees should be paid to the Secretary of the Hospital at the Office on entering for the Course.
J. G. GREENFIELD, Dean of Medical School.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.
THURSDAY, Feb. 5th.—4 P.M., Dr. Paterson: Acidosis and Vomiting in Infancy and Childhood.

QUEEN CHARLOTTE'S MATERNITY HOSPITAL POST-GRADUATE LECTURES, Marylebone-road, N.W.
THURSDAY, Feb. 5th.—5 P.M., Dr. C. H. Roberts: Malpresentations.

ST. JOHN'S HOSPITAL, 49, Leicester-square, W.C.
TUESDAY, Feb. 3rd.—5 P.M., Dr. Graham Little, M.P.: Lichen Planus.
THURSDAY.—5 P.M., Dr. J. L. Bunch: Pruritus. Prurigo. Lichenification.

ANCOATS HOSPITAL, MANCHESTER.
THURSDAY, Feb. 5th.—4.30 P.M., Mr. Diggle: Diseases of the Œsophagus.

ST. MARY'S HOSPITALS, MANCHESTER, POST-GRADUATE LECTURE (at Whitworth-street West Branch)
FRIDAY, Feb. 6th.—4.30 P.M., Dr. J. F. Ward: Management of Premature Infants.

MANCHESTER MEDICAL SOCIETY.
WEDNESDAY, Feb. 4th.—4.30 P.M., President's Address: Twins in Health and Disease.

UNIVERSITY OF LIVERPOOL POST-GRADUATE LECTURES. (At 3.30 P.M.)
MONDAY, Feb. 2nd.—(At the Children's Hospital.) Dr. Fordyce: Clinical.
TUESDAY.—(At the Southern Hospital.) Mr. T. R. W. Armour: Fractures in the Neighbourhood of the Ankle-joint.
WEDNESDAY.—(At the Northern Hospital.) Mr. Simpson: Surgical Cases.
THURSDAY.—(At the Stanley Hospital.) Dr. Gullan: Pernicious and Other Anæmias.
FRIDAY.—(At the Royal Infirmary.) Mr. Jeans: Urinary Cases.

ST. ANDREWS INSTITUTE FOR CLINICAL RESEARCH.
TUESDAY, Feb. 3rd.—4 P.M., Dr. J. Thomson: Albuminuria in Children and Adolescents. Discussion to be opened by Dr. Rowand and Dr. Paton.

THE PEOPLE'S LEAGUE OF HEALTH.
Lectures on What We Should Eat and Why, at the Medical Society of London, 11, Chandos-street, W.
WEDNESDAY, Feb. 4th.—6 P.M., Lieut.-Col. R. McCarrison, I.M.S.: Food of Mankind Treated Historically and Geographically.

Appointments.

MILLER, C. H., M.D. Camb., F.R.C.P. Lond., has been appointed Assistant Physician to the Royal Devon and Exeter Hospital.
POWELL, A. T. W., M.B., B.S. Lond., Assistant County Medical Officer of Health for the County of West Suffolk.
ROSE, W. G., F.R.C.S. Eng., M.B., B.S. Lond., Assistant Honorary Surgeon to the Derbyshire Royal Infirmary.
TODD, ALAN H., M.S., B.Sc. Lond., F.R.C.S. Eng., Honorary Orthopædic Surgeon to Croydon General Hospital.
Certifying Surgeons under the Factory and Workshop Acts: BROOME, F. C. S., M.B., B.S. Lond. (Ryde, I.O.W.); PARKER, C. S., M.R.C.S., L.R.C.P. Lond. (Coalville, Leicester); ALLAN, G. G., M.B., Ch.B. Edin. (Ayton); MCCRACKEN, W. J., M.B., B.Ch. Belf. (Haworth).

Vacancies.

For further information refer to the advertisement columns.
Aberdeen University.—Second Asst. in Pathology. £250.
Bath, Eastern Dispensary.—Res. M.O. £150.
Bolingbroke Hospital, Wandsworth Common, S.W.—Res. M.O. (male) £200. Also H.S. (male) at rate of £120.
Brighton, Royal Sussex County Hospital.—H.P. £150.
Bristol, Cossham Memorial Hospital, Kingswood.—Res. M.O. £150.
Cardiff City.—Asst. M.O. £600.
Devizes, Wilts County Mental Hospital.—Asst. M.O. £350.
Finchley Urban District.—M.O.H. and Sch. M.O. £900.
Hastings, Royal East Sussex Hospital.—Hon. Radiologist.
Hospital for Epilepsy and Paralysis, Maida Vale, W.—Med. Reg. £100.
Ladywell Sanatorium, Pendleton.—Asst. R.M.O. £350.
Lanark County.—M.O.H. £1300.
London Temperance Hospital, Hampstead-road, N.W.—Anæsthetist.
Maidstone, Kent County Ophthalmic Hospital.—H.S. £300.
Manchester, Ancoats Hospital.—Two H.S.'s. First 6 months at £100. Second 6 months at £150.
Margate, Royal Sea Bathing Hospital for Surgical Tuberculosis.—H.S.'s at rate of £200.
Ministry of Pensions, Birmingham, Highbury Hospital.—Jun. M.O. £350.
Queen's Hospital for Children, Hackney-road, Bethnal Green, E.—Asst. Cas. H.S. at rate of £100.
Rochdale Infirmary.—Radiologist.
Royal Chest Hospital, City-road, E.C.—Phys. Also M.O. in charge of Tuberculosis Dispensary. £750.
Royal Free Hospital, Gray's Inn-road, W.C.—Cas. O. £100.
Ryde, Royal Isle of Wight County Hospital.—Res. H.S. at rate of £180.
St. Mark's Hospital for Cancer, Fistula, &c., City-road, E.C.—H.S. £200.
St. Pancras Metropolitan Borough.—Asst. M.O. £600.
St. Paul's Hospital for Skin and Genito-Urinary Diseases, Endell-street, Holborn, W.C.—Hon. S. and Hon. Asst. S.
Salford Infectious Diseases Hospital, Ladywell Sanatorium, Pendleton.—Asst. R.M.O. £350.
Salford Royal Hospital.—Surg. Reg. £100.
Salisbury, General Infirmary.—H.S. £150.
Samaritan Free Hospital for Women, Marylebone-road, N.W.—H.S. at rate of £100.
Seamen's Hospital Society, Dreadnought Hospital, Greenwich.—Physicians.
Seamen's Hospital Society, Hospital for Tropical Diseases Endsleigh Gardens, N.W.—Med. Supt. £250.
Stirling District Mental Hospital, Larbert.—Second Asst. M.O. £275.
Stoke-on-Trent, North Staffordshire Infirmary.—H.S. £150.
West End Hospital for Nervous Diseases.—Asst. P., P. for Skin Dept., H.P. for In-patients. £150. Also Clin. Asst. in Special Dept.
West London Hospital, Hammersmith-road, W.—Hon. Surg. Reg. £100.
Woolwich Metropolitan Borough.—Asst. M.O. £600.
The Chief Inspector of Factories, Home Office, London, S.W., announces the following vacant appointments: Ossett, Yorks, West Riding; and Bruton, Somerset.

Births, Marriages, and Deaths.

BIRTHS.

ALEXANDER.—On Jan. 18th, at Woodside, Plymouth, the wife of Captain R. H. Alexander, M.C., R.A.M.C., of a son.
BLACKWELL.—On Jan. 17th, at Maison Bruges, Don-road, Jersey, the wife of Dr. A. S. Blackwell, of a son.
CROSBIE.—On Jan. 15th, at Ardcaien, Londonderry, the wife of Dr. Douglas E. Crossbie, Clarendon-terrace, Londonderry, of a daughter.
QUIRKE.—On Jan. 22nd, at York-road, Edgbaston, the wife of Major M. J. Quirke, I.M.S. (retired), of a daughter.

DEATHS.

BARWISE.—On Jan. 24th, suddenly, at Derby, Sidney Barwise, M.D., B.Sc., D.P.H., Medical Officer for the County of Derby, aged 62.
BEST.—On Jan. 23rd, at The Firs, Waltham Cross, after three weeks' illness, Frederick Henry de Graves Best, M.R.C.S., L.R.C.P., in his 56th year.
IRVINE.—On Jan. 20th, at Wellington College, Berks, from illness contracted on war service, Arthur Gerard Cheyne Irvine, M.R.C.S., L.R.C.P., Captain, R.A.M.C., late of Selly Oak, Birmingham, aged 60.
MACKENZIE.—On Jan. 26th, at Albert Hall Mansions, Kensington, London, Sir James Mackenzie, M.D., F.R.C.P., LL.D., F.R.S., honorary physician to His Majesty in Scotland, aged 71.
POLLARD.—On Jan. 20th, suddenly, George Frederick Pollard, M.D., M.R.C.S., of 24, Uxbridge-road, Hanwell, aged 70 years.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Comments, and Abstracts.

THE TREATMENT OF FRACTURES.

A Post-Graduate Lecture to the Fellowship of Medicine, delivered on Jan. 20th, 1925.

BY SIR W. ARBUTHNOT LANE, BART., C.B., M.S.,
PRESIDENT OF THE POST-GRADUATE MEDICAL ASSOCIATION.

I PROPOSE to consider the changes that have taken place in the method of treatment of simple fractures since I started operating on them in 1894, a period of more than 30 years. At that time the treatment of simple fractures was a disgrace to surgery. While that statement might be somewhat modified, I believe that at the present time no branch of surgery is as unsatisfactory as this is, and that a large proportion of the bad results of treatment are due in part to ignorance and in part to a want of skill of those into whose hands they are unfortunate enough to fall.

The average student while in the wards sees only a small number of cases of fracture, and he soon discovers that the views held and the methods and the results of treatment adopted by his several surgical teachers vary within very wide limits. The excellent radiography done at the big London or other large general hospitals enables him, however, to recognise the character of the fractures, and he must form his own opinion on the relative advantages of the several methods of treatment which he sees adopted. When he goes into practice he rarely has a case of fracture under his care and he soon realises the anxiety and risk that its treatment involves him in. He may experience great trouble in the accurate diagnosis of a fracture, since it is often impossible owing to difficulties of transport to obtain a radiogram in the case of fracture of the leg, and many of the radiographers and apparatus in country districts are not infrequently unable to produce perfect radiograms. A poor radiogram is often more misleading than none at all. The bad results of treatment, both functional and æsthetic, are very obvious, and as excellent radiograms can subsequently be easily obtained by the patient they may readily bring the medical attendant into a court of law and may expose him to great financial loss and professional discredit. It is not generally recognised how many actions for damages are stopped by the tactful advice of the consultant or by a compromise of a financial nature.

The most important law I ever formulated is that "the skeleton represents the crystallisation of lines of force." It is upon the knowledge of this law that the scientific treatment of fractures depends. The same law applies with equal truth to every soft structure in the body, and perhaps more effectually and obviously to the several portions of the gastro-intestinal tract, so as to impose on the community almost all the diseases of civilisation. Few surgeons appear to have sufficient mechanical knowledge and skill to deal effectually with fractures by operative procedures. As the risk of a possible unsuccessful result is so manifest, it is very advisable that any medical man who is asked to treat a fracture should call another into consultation, and he might with advantage choose an opponent. In this way he will materially safeguard his interests. In any case he should join a medical defence society when he starts in practice.

Operative Treatment.

In operations on simple fractures the operator may experience great difficulty in bringing the fragments into accurate continuity, especially when two bones are involved, or when there is much comminution. Even when the fragments are placed in apposition too short a plate may be employed with an insufficient number of screws, or the plate may be placed in an unsuitable position, or the precautions taken may not be sufficient to ensure perfect asepsis. It is no longer necessary to urge the wisdom of operating on simple fractures when the conditions which I put forward in my paper[1] in 1894 exist, the chief of which is the necessity of restoring perfect continuity of the fragments of a broken bone or bones by operation when it is of vital importance to the individual that the normal function of the skeleton has to be restored, assuming that it is not possible to obtain this result if other means have proved ineffectual. This applies to the leg even more than it does to the other bones, since it has to transmit the weight of the rest of the body.

The somewhat abrupt change in the manner in which the operative treatment of simple fractures was regarded by the profession was due to the wise action of the British Medical Association on the initiative of Sir Victor Horsley, the then President of the Surgical Section, in appointing and generously financing a committee to investigate the result of the various methods of treatment and in printing their full report as a separate publication. It was entitled the Report of the Committee on the Treatment of Simple Fractures. It contained a very full and accurate description of the methods and results of the treatment of fractures in the several parts of the world. The committee comprised 16 members, who took part in the investigation on which they expended much time and trouble. The conclusions which they arrived at fully bore out the accuracy of my views. The committee was appointed in February, 1911, and the report was published in November, 1912. This is, I believe, the only occasion on which the British Medical Association has taken such thorough and effectual measures to arrive at the truth and to inform the medical profession on a subject which had long been discussed with so much violence and acrimony.

The change in the attitude of surgeons to operative measures was at first followed by disastrous results, especially in America, where fractures were operated on by a large number of medical men whose experience and skill varied within wide limits. The failures that resulted from such indiscriminate operations were due to insufficient aseptic precautions as well as to lack of mechanical knowledge. This brought about a reaction against operation, the procedure being held responsible and not the want of familiarity of the operators with the details necessary to ensure success. Many surgeons, hoping to obtain better results, attempted to improve on the simple methods which I employed, and which I have used with uninterrupted success since. They made more complicated steel plates or they used plates made of bone; they devised elaborate and intricate screws and screw-drivers, drills, forceps for grasping the fragments and retaining them in apposition, and many other modifications, all of which rendered more difficult a procedure which in principle is perfectly simple, but which may be made most difficult and unnecessarily complex in its application.

Lessons of the War.

The war produced a great change in the treatment of fractures by operation. Many of those surgeons who had been most actively opposed to operations on simple fractures did not hesitate to put plates and screws into the fragments of the broken bones in compound fractures usually produced by projectiles with the most disastrous results. It took quite a long time before the folly of this procedure was realised and a stop was put to this practice. Even when the wound had healed or was apparently quiescent, the introduction of such large foreign bodies as plates and screws not infrequently resulted in the renewed activity in the growth of septic organisms which had lain dormant in the bone and in the soft parts, so that disaster followed such operative procedures only too frequently. It took a long time before this complication was recognised and dealt with, but finally the results obtained with suitable precautions were excellent.

With all this experience some surgeons still continue to secure the fragments of bone in recent compound fractures by means of plates and screws with the same most unfortunate results. Every new procedure would appear to involve necessarily much damage and loss of life to the community, till the principles of the treatment and their application have been thoroughly grasped by surgeons generally. The use of steel screws has been objected to on the ground that they produce a rarefying osteitis, and that they have to be removed in consequence. This is due to imperfect asepsis and results only when the aseptic precautions employed by surgeons are insufficient. That this does not occur if enough care is taken is demonstrated by a large number of radiograms which I will show you. It is perhaps not sufficiently recognised that the moderate degree of asepsis which is employed in operations generally throughout the body is quite inadequate for procedures involving the burying in the tissues of a quantity of metal. This only too readily affords a nidus and a medium for the growth of organisms, which do not exist in the wound in sufficient quantity to produce trouble without the presence of the foreign body.

Great advances were made during and since the war in the treatment of severe compound fractures of long bones especially, and much was done in improving methods of traction in simple fractures, by which the resistance offered to the apposition of fragments by the shortening up of the soft parts by hæmorrhage and inflammation can be gradually overcome.

Treatment by Extension.

The most effectual method of treatment of simple fractures of the shafts of the long bones of the leg in which operative interference is not called for is by forcible extension usually under an anæsthetic followed by the use of an ambulatory splint. The splint must be so constructed that while the fragments are being constantly extended the patient is able

[1] A Method of Treating Oblique Fractures of the Tibia and Fibula more Efficient than those in Common Use, Transactions of the Clinical Society, 1893–94.

to lead an active life, moving the joints of the damaged limb with perfect freedom. In this way not only does the patient avoid stiffness of the joints and muscles which accompanies the ordinary methods of treatment, but the formation of callus is hastened by the free circulation of blood through the limb. This splint can also be employed with great advantage after the fragments have been secured by means of plates and screws. In the case of fracture of the shaft of the long bones of the leg this principle is carried out in an ideal manner by the extension apparatus devised by Mr. Hoefftcke with which you are all probably familiar. The principle involved of replacement of fragments by extension, the continued exercise of traction by some form of apparatus, and the free spontaneous functioning of the muscles, soft parts, and joints in the vicinity of the fracture is that which governs the treatment of all simple and compound fractures. How often does one see a patient incapacitated for months, and sometimes permanently, by the limited range of movement of the joints in the vicinity of a fracture due to their having been left in one position for a long period. This complication is perhaps most serious in the case of a knee which has been allowed to become fixed in a flexed position.

In such cases of simple fracture in which the necessity for perfect function is not met by accurate apposition of fragments operation is called for. In the case of malunion following compound fractures only when the operator has every reason to suppose that the tissues have become freed from the presence of any organisms which existed in the original wound should surgical measures be undertaken with the object of restoring axial continuity of fragments. Such operations are often most difficult and may make a great demand on the knowledge, judgment, and skill of the operator. This is particularly the case when both bones of the forearm or leg are involved. Grafts of bones should be used freely to fill up any gaps that may remain between the fragments, though it should be borne in mind that quite a considerable interval can be readily filled in by the crystallisation of bone along the line of force. Great pains should be taken to secure them in position and immobilise them. The great advantage gained by the skilful employment of bone-grafts is illustrated by the remarkable work which was done by Mr. Gillies and the other surgeons and dentists at the Queen's Hospital, Sidcup. The methods devised and adopted by those men form a new era in the treatment not only of the damage produced by projectiles, but also of the various deformities and fractures of the bones of the face in civil life. The published works of Gillies and Pickerill contain full descriptions and illustrations of the various operative procedures requisite for these conditions.

CHARGES OF ADULTERATING MILK.

A CASE is to be stated by a bench of county justices in which a summons for selling milk deficient in cream was brought against a farmer and dismissed. A deficiency of milk-fat was apparently admitted, and also that there had been no deliberate abstraction of cream, the deficiency arising through the sample of milk upon which the proceedings were based having been drawn from the bottom of a vessel containing the milk, which had stood for a long enough time for the cream, or much of it, to have risen to the top. It was contended for the prosecution that this was tantamount to an abstraction of the cream and was to the prejudice of the customer. Whatever may be the decision of the divisional court upon this subject, it will tend to show whether legislation is necessary to safeguard the quality of milk supplied by dealers to the public or by farmers to dealers. It certainly is desirable in the interest of the public that no absolute defence should be possible when milk not up to a fixed standard is sold for food. Defences now raised, such as that the milk was as it came from the cow, neither skimmed nor adulterated, or was supplied under a warranty of quality would be better accepted in mitigation of a penalty than as a means of escaping all responsibility on the part of the person who sells to the consumer.

GEOGRAPHY AND CIVILISATION.

IN a little book first published in 1915, revised and enlarged recently, Mr. James Fairgrieve[1] has endeavoured to trace the influence of geographical factors on the course of history—on the one hand by stimulating action, on the other by showing how and where the most effective action shall take place. The book deals with the material side of history, and frankly ignores "those spiritual aspects of the drama which do not exhibit the geographical control." Civilisation first dawned on the flood-plains of Egypt and Mesopotamia because here were protected lands, having abundance of water and warmth. Mr. Fairgrieve passes on to discuss the rise of civilisation in the Eastern Mediterranean, and the redistribution of world power after the break-up of the Roman Empire. The ocean and the forest are shown to be the factors which have shaped the development of Western and Eastern Europe. Other great physical features are discussed in dealing with the rest of the world, the central theme of the book—man's increasing ability to control energy—being maintained throughout. The last chapter is a fascinating study of probable lines of advance in the light of man's accumulated knowledge and experience. No sphere shows greater triumphs than that of medicine. The construction of the Panama Canal was rendered possible by the investigation of tropical diseases. Malaria cost the Suez Canal 38,200 francs in 1903, while in 1908 the cost was less than half that amount. Additional supplies of energy thus liberated must inevitably bring about changes in the distribution of mankind and in habits of life which will profoundly influence the course of history.

The book displays a fine sense of proportion in dealing with so vast a topic.

[1] Geography and World Power. Fifth Impression. By James Fairgrieve, M.A., F.R.G.S. University of London Press. 1924. Pp. 373. 5s.

INTOLERANCE TO A DENTURE.

To the Editor of THE LANCET.

SIR,—In reply to the letter from "Medico" in your issue of Jan. 10th, I should advise him to regard his inability to wear a denture as due to psychological causes. I am taking for granted that the denture itself is all that it should be. Various gargles may be tried, but in a bad case success will only be achieved by practice and the will to overcome the difficulty.

I am, Sir, yours faithfully,

L. ERIC CHAS. PECKOVER,
Worthing, Jan. 21st, 1925. L.D.S., R.C.S. Eng.

RED-HAIRED ALBINOS.

To the Editor of THE LANCET.

SIR,—The presence of red hair in persons with albinotic characters is an association which has been noted in a relatively small number of cases. Two children were recently shown at the Royal Society of Medicine with these features, and there are a few other references in the literature on the subject.

It will be of interest, therefore, to record the following observation made by the late Mr. Joseph Conrad, the famous novelist, which occurs in his unpublished diary under date July 4th, 1890, while camped about a week up country from Matadi on his way to the Congo—a journey which produced his celebrated story "Heart of Darkness." I am indebted to Mr. Richard Curle, Conrad's friend and executor, for this observation and for permission to publish the extract from the diary, which runs as follows:—

"In the evening, three women, of whom one albino, passed our camp; horrid chalky white with pink blotches, red eyes, red hair, features very negroid and ugly."

Here we have in a few words from the pen of a keen observer and a master of descriptive writing, a woman with complete albinism of skin and eye since she was chalky white with the erythematous blotches produced by sun-burn, and had a red reflex from the eye, but with red hair. Conrad notices the repulsive appearance which all albino negroes present to us, and the fact that negroid facial characters appear more marked in a white-skinned native.

I am, Sir, yours faithfully,

London, Jan. 21st, 1925. HUGH S. STANNUS.

ON Jan. 21st the death took place at Hatch End of Mr. E. J. Sowerby, chairman of Messrs. H. K. Lewis and Co., Ltd. Owing to failing health he retired from active work in April last. He came to Gower-street in 1872, when Mr. H. K. Lewis was still at the head of the business. From 1880 he was manager under Mr. Morris Lewis. In 1905 a partnership was formed, of which he was the senior member. In 1915 the present company was created, Mr. Sowerby being chairman, with the other partners as directors.

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